

U.S. DEPARTMENT OF COMMERCE/Environmental Science Services Administration



Technical Report

INSTITUTES FOR ENVIRONMENTAL RESEARCH IER 55-IAS 2

Atmospheric Infrared Radiation Over the Antarctic



OCTOBER 1967

Boulder, Colorado

THE INSTITUTES FOR ENVIRONMENTAL RESEARCH

The mission of the Institutes is to study the oceans, and inland waters, the lower and upper atmosphere, the space environment, and the earth, seeking the understanding needed to provide more useful services. These research Institutes are:

- The Institute for Earth Sciences
conducts exploratory and applied research in geomagnetism, seismology, geodesy, and related earth sciences.
- The Institute for Oceanography
works to increase knowledge and improve understanding of the ocean and its interaction with the total physical environment of the globe.
- The Institute for Atmospheric Sciences
seeks the understanding of atmospheric processes and phenomena that is required to improve weather forecasts and related services and to modify and control the weather.
- The Institute for Telecommunication Sciences and Aeronomy
supports the Nation's telecommunications by conducting research and providing services related to radio, infrared, and optical waves as they travel from a transmitter to a receiver. The Institute is also active in the study and prediction of periods of solar activity and ionospheric disturbance.

Environmental Science Services Administration

Boulder, Colo.



U. S. DEPARTMENT OF COMMERCE

Alexander B. Trowbridge, Secretary

ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION

Robert M. White, Administrator

INSTITUTES FOR ENVIRONMENTAL RESEARCH

George S. Benton, Director

ESSA TECHNICAL REPORT IER 55-IAS 2

Atmospheric Infrared Radiation Over the Antarctic

P. M. KUHN

L. P. STEARNS

J. R. STREMIKIS

INSTITUTE FOR TELECOMMUNICATION SCIENCES AND AERONOMY

BOULDER, COLORADO

October 1967

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402
Price 50 cents.



Digitized by the Internet Archive
in 2012 with funding from
LYRASIS Members and Sloan Foundation

<http://archive.org/details/atmosphericinfra00kuhn>

CONTENTS

Contents	i
Symbols and Definitions	ii
1.0 Introduction	1
2.0 Physical Description of Radiometersonde	2
2.1 Construction	3
2.2 Thermistor Calibration	4
2.3 The Radiometer as Part of the Radiosonde System	5
3.0 Radiometersonde Equations	
3.1 The Power Balance of the Radiometer Surface for Infrared Radiation	6
3.2 The Power Losses, $L(t)$ and $L(b)$	7
4.0 Precision of the Radiometric Measurements	8
5.0 Sounding Stations	12
6.0 Data Presentation	13
7.0 References	15
8.0 Appendices	16

SYMBOLS AND DEFINITIONS

R	= resistance of thermistor
$R(0)$	= "calibration" thermistor resistance
T	= ambient temperature
$T(0)$	= "calibration" temperature
β, s	= thermistor materials constants
f	= frequency, bi-cps
$F(\text{ref})$	= reference frequency, bi-cps (95.0)
$R(\text{ref})$	= reference resistance of radiosonde blocking oscillator (43,700 ohms)
P^-, P^+	= irradiance directed toward and away from top radiative surface (langleys/min)
$L(t), L(b)$	= heat loss per unit area of the top and bottom radiative surfaces respectively, due to conduction, convection and heat storage (langleys/min)
r	= reflectivity of polyethylene film to infrared radiation
τ	= transmissivity of polyethylene film to infrared radiation
a	= absorptivity of the blackened radiative sensor surface for infrared radiation
ϵ	= absorptivity of the polyethylene film for infrared radiation
$B(st), B(sb)$	= black body function, T^4 for top and bottom radiative sensor surfaces, respectively (langleys/min)
R^-, R^+	= infrared irradiance directed downward and upward in the atmosphere (langleys/min)
$B(p)$	= black body function, for polyethylene film
$R(N)$	= net atmospheric infrared irradiance (langleys/min)
$k(t), k(b), k(i)$	= thermal conductivity of top air, interior, bottom air cell, respectively

SYMBOLS AND DEFINITIONS (continued)

$T(t)$, $T(a)$, $T(b)$ = temperature of top surface, air, bottom surface, respectively ($^{\circ}\text{C}$)

$\Delta(\theta)$ = product of effective specific heat and effective mass/ cm^2 of the thermistor-aluminum-air-styrofoam combination, experimentally found from speed of response to be 7×10^{-3} cal/ cm^2 deg.

λ = finite time interval

ABSTRACT

The total thermal radiative power exchange at the atmosphere-earth interface and within the atmosphere is a direct measure of energy (power) available to drive the "heat engine" that circulates the atmosphere. In view of this, its implication in meteorological analysis is vital for the approach to a full solution of atmospheric circulation.

The lack of a sufficient number of surface and upper air thermal radiation soundings prompted the development of the radiometersonde, a low-cost balloon-borne radiometer. This instrument, flown as part of a standard radiosonde ascent, separately measures upward, downward, and net thermal radiation.

A summary and analysis of 400 out of 2000 Antarctic radiometersonde ascents gives 40,000 individual measurements of net, upward, and downward thermal radiation. The average stratospheric net outward radiation for Pole Station in the dark season is 0.145 ly/min, and that for Byrd Station is 0.210 ly/min. The standard deviation about the average for Pole Station is 0.039, and for Byrd Station 0.005 ly/min.

radiation
radiometersonde
net radiation

thermal radiation
balloon-borne radiometer
heat budget
radiosonde

ATMOSPHERIC INFRARED RADIATION OVER THE ANTARCTIC
(Including a physical description of the radiometersonde,
its equations and precision)

P. M. Kuhn, L. P. Stearns, and J. R. Stremikis

1.0 INTRODUCTION

Net radiation is important to many meteorological problems because it is a measure of the energy available at the earth-atmosphere interface. The net radiation normal to the earth's surface is the difference between the total upward radiation flux and the total downward radiation flux. This energy exchange at the earth's surface represents the major input to the giant heat engine which circulates the atmosphere (Suomi and Kuhn, 1958).

A number of instruments which measure net radiation are available (Albrecht, 1933; Gier and Dunkle, 1951; Suomi, Fransilla, and Islitzer, 1954). Most of them are fairly expensive. As a result, net radiation observations are made at a few world locations, and it is not possible to study the effects of a variable heat input on weather from these isolated measurements. They are far too few to give anything approaching a representative sample. We describe a balloon-borne radiometer of moderate accuracy, but very low in cost, and present the results of 400 radiometric balloon ascents over Antarctica.

Reference to the text portion of this report will be made in subsequent issuances of more than 2,000 radiometric soundings over widely separated global regions. The low cost and simple construction of the radiometer described here make it possible to obtain many observations of radiation over land and ocean both at the surface and in the atmosphere. When thermistors are used to measure the temperature of the upper and lower blackened surfaces of such a radiometer, it is possible to telemeter this information in a manner similar to that used to transmit air

temperatures in the ordinary radiosonde. With light-weight material for insulation and framework, the net radiometer can be made light enough to be carried aloft by a radiosonde balloon. Figure 1 shows an instrument that weights only 90 grams. To telemeter air temperature, humidity, and upper and lower surface temperatures, a sequencing switch or a solid-state multiplexer is added. Details of the instrument are given by Suomi and Kuhn (1958).

2.0 PHYSICAL DESCRIPTION OF THE RADIOMETERSONDE

Figure 2 is a schematic diagram of the radiometer in vertical cross section. Briefly, it is a double-faced, hemispheric bolometer with broad-response, blackened sensing surfaces shielded from ventilation by thin membranes of polyethylene film. Flux evaluations are made for $0.5\text{-}\mu$ spectral intervals, taking into account the "non-flatness" of the black surfaces or for a "flat" spectral interval of approximately 4.0 to 100.0μ (2280 cm^{-1} to 100 cm^{-1}). The mean absolute error for the observations does not exceed $.02$ langleys/min. (The precision of the instrument is considered in section 4.)

The blocking oscillator modulates the carrier frequency through a pulsing circuit, and changes in the resistance of the thermistor vary the grid input to the blocking oscillator. Audio intelligence in the range 0 to 200 cps is recovered at the ground stations; the sequencer provides observations every 100 ms. The radiometer is attached to the side (covered with aluminum foil) of a U.S. Weather Bureau type radiosonde or held a short distance out from it.

The original design of the radiometersonde was altered in 1963 to improve the quality of the measurements. The modified instrument is superior in performance compared with that of its predecessor and has been verified by flight tests (Kuhn and Johnson, 1966). A basic improvement lies in better horizontal isolation of the sensors from the environment through which they are ascending.

The new radiometer unit, shown in figure 1 with a modified radiosonde and switching device, is circular in design and is symmetrical about a bead or rod thermistor on each sensing surface. Construction details of the radiometer are in figure 2, which shows (a) the radiometer body composed of back-to-back identical "trays" made of expanded polystyrene; (b) details of how the sensing surface and bead thermistor are attached to the upper and lower surfaces of the radiometer; and, (c) the complete radiometer with double polyethylene windows on the top and bottom of the sensor.

2.1 Construction

No changes have been made in any vertical dimensions of the original radiometer design, as these dimensions are optimum for suppressing convection (De Graff and Van der Held, 1953). The air cavity in the center of the radiometer body is also the same as in the earlier model and is divided by a thin, rigid, aluminum radiation shield.

To reduce lateral conduction, low conductivity, 40-gauge wire leads were used for the thermistors. As shown in figure 2(b), the beads are cemented with a high thermal conductivity epoxy resin to a thin, .001-in.

aluminum sensing surface. The sensor outer surface is painted with a flat-black paint having an average absorptivity of 90 percent.

The time constant ($1/e$) is approximately 1.0 min. As a result, the instrument can detect multilayered cloud structure. Lateral conduction seems to be negligible on the present model because the measured downward irradiance approaches zero, on the average, as ascents reach 3 to 6 mb.

2.2 Thermistor Calibration

The overall measurement accuracy is enhanced by individual calibration of the thermistors used on the sensors. When a set of resistance and temperature values is obtained for each thermistor by this method, the data are used to determine the best thermistor constants, β and s , for each thermistor by a Gauss-Jordan, least-squares regression from the expression for thermistor resistance, R ,

$$\frac{R}{R(0)} = \frac{e^{\beta/T} T^{-s}}{e^{\beta/T(0)} T(0)^{-s}} .$$

The β and s values are used to compute a table of resistance, R , vs. temperature, T , at 0.1°C intervals for each thermistor. The tables are also converted to values of radiosonde frequency, f , vs. temperature, T . The expression for conversion from resistance to frequency values, based on the expression for the frequency vs. resistance of the radiosonde modulator circuit, is:

$$f = \frac{F(\text{ref}) \times R(\text{ref})}{R + R(\text{ref})} .$$

Frequencies and resistances are those of the standard U.S. 1680-Mc radiosonde.

The thermistor calibration results in an accuracy for the radiometer temperature data of $\pm 0.2^{\circ}\text{C}$ at the $2\text{-}\sigma$ level. The rms error in the irradiance measured by the radiometersonde results in a relative precision of less than .01 langleys/min.

2.3 The Radiometer as Part of the Radiosonde System

The radiometersonde for the Antarctic program consisted of a basic Weather Bureau 1680-Mc radiosonde modified to include the radiometer. A sequencer within the radiosonde controlled the parameters telemetered. It was divided into six segments that sampled top radiometer temperature, bottom radiometer temperature, and meteorological data. The dwell times for the various segments are 3 sec, 3 sec, 24 sec, 3 sec, etc. When the sequencer samples meteorological data for 24.0 sec, the radiosonde baroswitch controls the meteorological elements to be reported (pressure, air temperature, and humidity), as on a conventional radiosonde, but when the sequencer interrogates top or bottom radiometer temperature, these parameters interrupt the normal sequence of the baroswitch. At times this will result in interrupted reference contacts or the masking of the start or end of a reference contact. Particular care has been exercised in evaluating the records to insure proper identification of the reference contacts because of this interruption.

3.0 RADIOMETERSONDE EQUATIONS

3.1 The Power Balance of the Radiometer Surface for Infrared Radiation

To determine what the surfaces of the radiometer are measuring, one must consider their power budget, a subject discussed by Tanner, Businger, and Kuhn (1960) and by Suomi and Kuhn (1958). Their studies are summarized below.

Under steady-state conditions we may express the power balance for the top radiation surface of the radiometer as

$$P^- + P^+ = L(t) \quad (3.1)$$

$$P^- = rP^+ + \tau R^- + \epsilon B(p) \quad (3.2)$$

$$P^+ = aB(s) + (1-a)P^- . \quad (3.3)$$

The power loss term, $L(t)$, will be elaborated on below.

Equations (3.1), (3.2), and (3.3) may be solved as a system to eliminate P^+ and P^- . We then obtain, as shown graphically in figure 3:

$$R^- = B(st) + \frac{1-r(1-a)}{a(1-r)} L(t) + \frac{\epsilon}{1-r} (R^- - B(p)) . \quad (3.4)$$

Since $\epsilon \ll (1-r)$, the last term of the right side of (3.4) may be eliminated.

Similarly, the expression for R^+ , measured by the underside of the radiometer, is found to be

$$R^+ = B(sb) + \frac{1-r(1-a)}{a(1-r)} L(b) . \quad (3.5)$$

Net radiation is given by

$$R(N) = R^+ - R^- . \quad (3.6)$$

3.2 The Power Losses, $L(t)$ and $L(b)$

Three-dimensional heat transfer has to be considered in evaluating the conduction and convection phenomena from the radiation surfaces through the air cells and insulating material (low density expanded polystyrene). A heat-storage term is also required for an exact solution, and the design of the instrument must be maintained with such vertical dimensions that convection is prevented (De Graaf and Van der Held, 1953). By keeping the ratio of the radius of the circular radiometer to one-half its thickness at least 4 : 1, lateral heat conduction can be shown to be less than 3 percent of the total measured irradiance for either side of the instrument (Beckmann, 1966).

Then, we have

$$L(t) = ((k(t))(T(t) - T(a))/1.4 + ((k(i))(T(t) - T(b)))/2.8 + (\lambda)(\Delta T(t)/\Delta \theta) \quad (3.7)$$

and

$$L(b) = ((k(b))(T(b) - T(a))/1.4 + ((k_1(i))(T(b) - T(t)))/2.8 + (\lambda)(\Delta T(b)/\Delta \theta), \quad (3.8)$$

where 1.4 and 2.8 represent vertical dimensions in the radiometer in centimeters.

Paraphrasing Tanner, Businger, and Kuhn (1960): "The approximation of linear heat flow is best when the air temperature is between the top and bottom temperatures. In this case the error in L will not exceed 2 or 3 percent. The error is somewhat larger when the air temperature is colder or warmer than both $T(t)$ and $T(b)$. For instance, when

$T(a) > T(t) > T(b)$, both $L(t)$ and $L(b)$ will be underestimated by about the same amount.

The result is that in all cases the expressions for net radiation are very nearly correct, because only the difference of the losses $L(t)$ and $L(b)$ appear."

4.0 PRECISION OF THE RADIOMETRIC MEASUREMENTS

In the absence of a universally accepted and accessible secondary standard for measurements in the infrared portion of the spectrum, one can only cite radiative transfer theory and isolated experiments when assessing the precision of any broad spectral response, flat-plate radiometer. One immediate objection to transfer theory to validate observation arises when one asks if there is ever a time when the earth's atmosphere consists of only water vapor, carbon dioxide, and ozone as infrared radiators. For experiments, on the other hand, one has to face the question of interpretation of the results and the skill of the experimenter. It is only in total, rather than by part, that the precision or absolute accuracy of the radiometersonde in this instance can be estimated. Then, too, there is the problem of absolute or relative accuracy. For many research studies relative accuracy, where known, is completely satisfactory.

Evidence for the precision and relative accuracy of the radiometersonde is contained in the reports of Tanner, Businger, and Kuhn (1960), Kuhn and Johnson (1966), and Bushnell and Suomi (1961). Rather than make

a complete study of any one of these, or other reports, we will refer briefly to additional pertinent investigations.

a. The second radiometersonde intercomparisons held in Green Bay, Wisconsin, and Miami, Florida, provided an opportunity to compare, at the same instant in real time, radiometric profiles determined by German and American instruments. These radiometers operate on basically different principles. The rms difference for 240 observations was $\pm .015$ langley/min. One might conclude from this that both instruments are correct or both wrong. In the light of transfer theory, however, one can see that both are "reasonably" correct. A reference to these results, as yet unpublished, is given in a recent study.

b. Transfer approximation calculations (Kuhn and Cox, 1966), mainly for the upward irradiance and in the absence of any "clouds," are in good agreement with simultaneous radiometersonde observations through 350 mb. The rms difference between the observations and calculations is $\pm .015$ langley/min. There is, however, a systematic departure of observed upward irradiance from calculated upward irradiance in 90 percent of all ascents with the observed irradiance above approximately 350 mb becoming less than the calculated. This may be explained on the basis of the calculated water vapor emission cutoff above the 350-mb level caused by the absence of hygistor moisture data. By saturating the "calculation" atmosphere with respect to water vapor above the hygistor cutoff level, we can continue agreement of upward calculated and observed irradiance to

10-15 mb in 30 percent of the ascents. The "cloud" factor obviously cannot be ignored, but at present there is no satisfactory method of incorporating cloud or aerosol radiators into the transfer approximations. The discrepancy between calculation and observation is clearly caused by additional radiators such as high thin cirrus. The average difference between calculated and observed irradiances above the hygistor cutoff is + .050 langley/min.

The observed downward irradiance from approximately 10 mb down to 150 mb averages .020 langley/min less than the calculated, with the maximum difference occurring at the higher pressures. The results above were obtained from a sample of 25 of the 400 ascents to be presented.

c. Perhaps the two most important single considerations affecting the precision of the radiometersonde calculations are the storage term and the ventilation of the polyethylene windows.

Storage term -- This term is represented by $((\lambda)(\Delta T/\Delta \theta))$ in (3.7) and (3.8). In the present equations for the evaluation of the observed radiation, the heat storage in the instrument is treated by the last term on the right side of (3.8). This is an empirical relationship, outlined by Kuhn and Johnson (1966). The storage term has about the same effect on the upward and downward evaluated irradiance measurements. Thus, the vertical divergence of the net radiation and resulting infrared radiative cooling would not change. Similarly,

calculations involving the relative change of either the upward or the downward irradiance would not be appreciably affected. There does appear to be uniform agreement on our evaluation of the observed irradiances in the middle and lower troposphere, the region for which there are satisfactory moisture measurements and for which ventilation is definitely adequate.

Ventilation -- A recent test indicates that the ventilation of the upper and lower polyethylene surfaces of the radiometer are equal during balloon ascent or parachute descent. However, preliminary indications favor a correction function to account for insufficient ventilation above approximately 100 mb through 10 mb during ascent. An empirical correction of the form,

$$P = -1.51 \times 10^{-6} p^2 + 1.6 \times 10^{-2} \quad (4.1)$$

appears to provide a reasonable correction. This results in a power addition to the upward and downward irradiance of .015 langley/min at 10 mb, reducing to zero at 100 mb. These small adjustments are not included in the tabulated data; further experiments are necessary before they can be incorporated.

d. The time constant of the radiometer, of the last term on the right in (3.7) and (3.8), has been experimentally determined to be 1 min. Staley (1966) recently verified this fact.

e. In some instances radiometers were not allowed to reach a steady state at the surface before release of the balloon train. As a result, from 2 to 4 min were required before the irradiation observed was representative of the total irradiance field

illuminating the instrument. This occurs most frequently when moving from a warm conditioning room to extremely cold ambient surface conditions and immediate release. This situation is readily discernible in the data.

5.0 SOUNDING STATIONS

Monthly averages, dark season averages, and midwinter averages are listed for the four following stations:

Byrd, located at latitude $80^{\circ} 01'$ S., longitude $119^{\circ} 30'$ W. on a relatively flat snow plain elevated 5030 ft above mean sea level (1533 m).

Hallett, located at latitude $77^{\circ} 44'$ S., longitude $41^{\circ} 07'$ W. on the Felchmer Ice Shelf about 1 mi from the Weddell Sea and 80 mi from the nearest land. It is surrounded by water to the west, north, and east at an elevation of 140 ft above mean sea level (43 m).

Amundsen-Scott, located within a few yards of the geographical South Pole on a snow plain about 300 mi from the Beardmore Glacier at an elevation of 9186 ft above mean sea level (2800 m).

Wilkes, located at latitude $66^{\circ} 16'$ S., $110^{\circ} 31'$ E. on the westerly tip of Clark Peninsula jutting into the Vincennes Bay. It is surrounded on the south, west, and north by water and slopes upward to the east to the edge of the continental ice shelf. The elevation of Wilkes station is 31 ft above mean sea level (9 m).

6.0 DATA PRESENTATION

The tabular data presented in this report were obtained on the following scheduled radiometersonde flights during 1963:

	<u>BYRD</u>	<u>HALLETT</u>	<u>AMUNDSEN-SCOTT</u>	<u>WILKES</u>
March 1-31	0300Z	1200Z	0000Z	2100Z
April 1-10	0300Z	0600Z	0000Z	2100Z
April 11-May 11	0000Z	0600Z	0000Z	2100Z
May 11-21	0000Z	0000Z	0000Z	2100Z
May 22-July 22	0000Z	0000Z	0000Z	0000Z
July 22-Aug 1	0000Z	0000Z	0000Z	2100Z
Aug 2-Sept 1	0000Z	0600Z	0000Z	2100Z
Sept 2-10	0300Z	0600Z	0000Z	2100Z
Sept 11-Oct 15	0300Z	1200Z	0000Z	2100Z

The data and analyses of data are presented in Appendices A through

F. A description of the contents of each Appendix follows:

A: Monthly radiometersonde data averages by stations

(Vertical coordinate in pressure increments).

B: Three-month (June, July, August) radiometersonde data averages

by stations (Vertical coordinate in pressure increments).

C: Dark season radiometersonde data averages by stations

(Vertical coordinates in pressure increments).

D: Monthly radiometersonde data averages by stations

(Vertical coordinate in 2 km increments).

E: Computer plots of monthly radiometersonde data averages by stations.

F: Computer plots of June, July, August radiometersonde data averages by stations.

In view of the large amount of data involved in presenting daily radiometersonde balloon ascent data, this material has been consolidated. It will appear in a Technical Memorandum available upon request to the Scientific Documentation Division, ESSA, Boulder, Colorado.

Each daily radiometersonde data tabulation includes sky condition. The times for the daily ascents are within 1 hour of the times listed above.

7.0 REFERENCES

- Albrecht, F. (1933), Ein Strahlungsbilanzmesser zur Messung des Strahlusshaushalten von Oberflächen. *Meteor. Z.*, 50, No. 5, 62-65.
- Bechmann, W. H. (1966), Engineering Experiment Station, Univ. of Wis., Madison, Wis., personal communication.
- Bushnell, R. H., and V. E. Suomi (1961), Experimental flight verification of the economical net radiometer, *J. Geophys. Res.*, 66, No. 9, 2843-2848.
- De Graaf, J. G. A., and E. F. M. Van der Held (1953), The relation between the heat transfer and the convection phenomena in enclosed plane air layers, *Appl. Sci. Res.*, 3A, No. 16, 393-409.
- Gier, J. T., and R. V. Dunkle (1951), Total hemispherical radiometers, *Proc. Am. Inst. Elect. Engrs.*, 70, No. 7, 339-343.
- Kuhn, P. M., and D. R. Johnson (1966), Improved radiometersonde observations of atmospheric infrared irradiance, *J. Geophys. Res.*, 71, No. 2, 367-373.
- Staley, D. O. (1966), The lapse rate of temperature following an air parcel, *Quart. J. Roy. Meteorol. Soc.*, 92, No. 391, 147-150.
- Suomi, V. E., M. Fransilla, and N. Islitzer (1954), An improved net radiometer, *J. Meteor.*, 11, No. 4, 276-282.
- Suomi, V. E., and P. M. Kuhn (1958), An economical net radiometer, *Tellus*, 10, No. 1, 160-165.
- Tanner, C. B., J. A. Businger, and P. M. Kuhn (1960), The economical net radiometer, *J. Geophys. Res.*, 65, No. 11, 3657-3667.

APPENDIX A

Monthly Radiometersonde Data Averages by Stations
(vertical coordinate in pressure increments)

BYRD 1963 MARCH AVERAGE

PRES ¹	TEMP ²	R-UP ³	S-RU ⁴	R-DN ⁵	S-RD ⁶	R-NET ⁷	COOL ⁸	S-CL ⁹	Q ¹⁰	S-Q ¹¹	N ¹²
800.	-35.6	.2579	0.000	.2531	.016	.0048	.32	.447	.1771	.120	2.
750.	-27.5	.2615	.027	.2264	.029	.0350	.99	1.828	.3743	.123	4.
700.	-27.4	.2672	.023	.2089	.019	.0583	2.74	1.980	.3964	.090	4.
650.	-29.2	.2721	.018	.2020	.017	.0702	1.40	1.133	.3120	.129	4.
600.	-31.9	.2745	.016	.1936	.016	.0809	1.27	.152	.2490	.117	4.
550.	-34.6	.2701	.016	.1822	.016	.0880	.83	.396	.2197	.093	4.
500.	-38.4	.2649	.012	.1714	.015	.0935	.65	.529	.1303	.114	4.
450.	-43.1	.2587	.013	.1574	.012	.1013	.91	.625	.0059	.012	4.
400.	-48.0	.2498	.011	.1396	.010	.1102	1.04	.610	0.0000	0.000	4.
350.	-53.4	.2398	.013	.1216	.008	.1182	.95	.881	0.0000	0.000	4.
300.	-52.9	.2254	.015	.1034	.011	.1219	.44	.851	0.0000	0.000	4.
250.	-47.4	.2156	.006	.0911	.015	.1245	.30	.777	0.0000	0.000	4.
200.	-46.6	.2186	.007	.0928	.019	.1258	.15	.286	0.0000	0.000	4.
150.	-47.6	.2207	.008	.0872	.018	.1335	.91	.546	0.0000	0.000	4.
100.	-50.1	.2207	.008	.0767	.015	.1440	1.23	.274	0.0000	0.000	4.
80.	-51.3	.2183	.008	.0706	.013	.1476	.79	1.619	0.0000	0.000	4.
60.	-53.1	.2199	.009	.0660	.013	.1540	.83	2.403	0.0000	0.000	4.
50.	-54.8	.2201	.004	.0642	.010	.1559	1.12	.727	0.0000	0.000	4.
45.	-55.6	.2196	.007	.0580	.014	.1617	3.55	5.460	0.0000	0.000	4.
30.	-56.0	.2167	.008	.0520	.008	.1647	1.70	2.915	0.0000	0.000	4.
20.	-52.9	.2219	0.000	.0518	0.000	.1701	5.42	0.000	0.0000	0.000	1.
10.	-54.3	.2264	0.000	.0132	0.000	.2132	53.20	0.000	0.0000	0.000	1.

BYRD 1963 APRIL AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
800.	-23.4	.3196	.035	.3050	.050	.0145	0.00	0.000	.7223	.598	5.
750.	-23.3	.2935	.051	.2628	.058	.0307	1.69	1.751	.7577	.587	8.
700.	-23.8	.3009	.050	.2510	.057	.0500	2.26	1.308	.7189	.559	8.
650.	-26.8	.3075	.045	.2399	.053	.0676	2.08	1.130	.5920	.485	8.
600.	-30.6	.3058	.042	.2240	.047	.0818	1.67	.842	.4485	.382	8.
550.	-34.4	.2989	.038	.2022	.041	.0967	1.75	1.323	.3089	.299	8.
500.	-38.6	.2909	.034	.1819	.043	.1090	1.45	1.321	.1732	.241	8.
450.	-43.0	.2796	.030	.1586	.034	.1209	1.41	.616	.0637	.152	8.
400.	-47.5	.2667	.027	.1365	.026	.1302	1.09	.589	.0323	.091	8.
350.	-52.3	.2564	.024	.1194	.021	.1370	.81	.654	0.0000	0.000	8.
300.	-55.4	.2447	.020	.1008	.016	.1439	.80	.569	0.0000	0.000	8.
250.	-53.0	.2316	.015	.0855	.012	.1461	.26	.670	0.0000	0.000	8.
200.	-51.6	.2308	.015	.0814	.009	.1494	.39	.546	0.0000	0.000	8.
150.	-52.8	.2324	.015	.0775	.009	.1548	.64	.480	0.0000	0.000	8.
100.	-56.1	.2313	.017	.0704	.007	.1609	.71	.863	0.0000	0.000	8.
80.	-57.8	.2314	.017	.0664	.006	.1650	.47	2.367	0.0000	0.000	7.
60.	-61.6	.2266	.017	.0591	.007	.1676	2.12	2.968	0.0000	0.000	5.
50.	-62.8	.2265	.016	.0554	.005	.1710	2.02	2.961	0.0000	0.000	5.
40.	-64.2	.2267	.018	.0493	.007	.1773	4.74	5.849	0.0000	0.000	5.
30.	-65.6	.2255	.016	.0445	.007	.1811	2.55	6.546	0.0000	0.000	5.
20.	-65.1	.2421	.012	.0441	.004	.1980	2.41	.387	0.0000	0.000	2.
10.	-65.6	.2516	.020	.0222	.008	.2293	15.00	25.377	0.0000	0.000	2.

¹Pressure in millibars

²Air temperature in degrees Centigrade

³Upward irradiance in langley's per minute

⁴Standard deviation, σ , of upward irradiance in langley's per minute

⁵Downward deviation, σ , of upward irradiance in langley's per minute.

⁶Standard deviation, σ , of downward irradiance in langley's per minute

⁷Net irradiance in langley's per minute

⁸Monthly average of the radiative cooling in degrees Centigrade per day. Unsigned quantities designate cooling. Negative signs designate warming

⁹Standard deviation, σ , of μ radiative cooling

¹⁰Mixing ratio in grams per kilogram of water

¹¹Standard deviation, σ , of the mixing ratio

¹²Number of observations at a particular pressure height

BYRD 1963 MAY AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
800.	-30.1	.2948	.020	.2901	.029	.0047	0.00	0.000	.3167	.188	3.
750.	-25.4	.2691	.023	.2394	.040	.0297	.64	1.356	.5141	.212	9.
700.	-25.6	.2774	.023	.2359	.045	.0416	1.39	.966	.5292	.214	9.
650.	-28.0	.2852	.020	.2292	.046	.0560	1.70	.822	.4259	.206	9.
600.	-30.9	.2863	.019	.2160	.045	.0703	1.68	.580	.3324	.162	9.
550.	-34.8	.2827	.018	.2008	.046	.0819	1.37	.680	.2385	.121	9.
500.	-39.5	.2750	.017	.1805	.044	.0945	1.48	.696	.1088	.125	9.
450.	-44.8	.2668	.015	.1600	.039	.1068	1.44	.813	0.0000	0.000	9.
400.	-50.4	.2554	.014	.1391	.032	.1164	1.13	.557	0.0000	0.000	9.
350.	-56.6	.2431	.014	.1144	.024	.1287	1.45	1.289	0.0000	0.000	9.
300.	-62.0	.2294	.012	.0924	.014	.1369	.97	1.219	0.0000	0.000	9.
250.	-62.6	.2122	.010	.0771	.007	.1352	-.21	.778	0.0000	0.000	9.
200.	-60.9	.2043	.014	.0698	.006	.1345	-.08	.636	0.0000	0.000	9.
150.	-63.3	.2071	.016	.0659	.008	.1412	.79	.873	0.0000	0.000	9.
100.	-67.2	.2067	.014	.0558	.008	.1508	1.14	.716	0.0000	0.000	9.
80.	-69.8	.2070	.014	.0498	.007	.1572	2.90	1.334	0.0000	0.000	8.
60.	-73.3	.2099	.016	.0417	.007	.1682	3.63	2.699	0.0000	0.000	7.
50.	-74.5	.2109	.014	.0380	.009	.1729	2.78	3.172	0.0000	0.000	7.
40.	-75.9	.2158	.011	.0365	.012	.1792	3.86	3.361	0.0000	0.000	5.
30.	-76.6	.2169	.014	.0275	.015	.1893	7.97	4.587	0.0000	0.000	5.
20.	-78.3	.2245	.013	.0358	.019	.1887	3.61	.248	0.0000	0.000	2.
10.	-78.0	.2266	0.000	.0042	0.000	.2224	12.72	0.000	0.0000	0.000	1.

BYRD 1963 JUNE AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
800.	-22.8	.3112	.028	.2676	.029	.0435	0.00	0.000	.6422	.234	5.
750.	-20.5	.3064	.027	.2421	.025	.0643	1.93	2.193	.7213	.216	10.
700.	-22.1	.3140	.024	.2300	.024	.0840	2.33	.694	.5799	.294	10.
650.	-24.9	.3164	.022	.2202	.025	.0962	1.44	.386	.4592	.253	10.
600.	-28.0	.3123	.022	.2065	.027	.1058	1.13	.447	.3222	.209	10.
550.	-32.2	.3073	.021	.1930	.023	.1143	1.00	.520	.1923	.161	10.
500.	-37.1	.3007	.020	.1764	.022	.1243	1.17	.757	.1187	.101	10.
450.	-42.7	.2898	.020	.1587	.024	.1311	.81	1.206	.0174	.042	10.
400.	-48.9	.2781	.017	.1403	.024	.1378	.79	.966	0.0000	0.000	10.
350.	-55.5	.2634	.017	.1186	.022	.1448	.83	.749	0.0000	0.000	10.
300.	-62.4	.2502	.017	.0986	.017	.1516	.80	.728	0.0000	0.000	10.
250.	-67.7	.2360	.013	.0781	.009	.1579	.74	1.331	0.0000	0.000	10.
200.	-69.0	.2232	.014	.0651	.008	.1582	.03	.423	0.0000	0.000	10.
150.	-70.2	.2182	.015	.0578	.010	.1603	.26	.675	0.0000	0.000	10.
100.	-74.5	.2178	.015	.0515	.007	.1663	.70	1.516	0.0000	0.000	10.
80.	-77.2	.2172	.019	.0495	.010	.1677	.57	2.609	0.0000	0.000	9.
60.	-80.0	.2184	.023	.0441	.013	.1742	1.75	3.708	0.0000	0.000	8.
50.	-81.2	.2196	.022	.0390	.014	.1805	3.71	2.462	0.0000	0.000	8.
40.	-82.3	.2231	.021	.0361	.010	.1870	6.79	6.598	0.0000	0.000	8.
30.	-83.7	.2247	.012	.0297	.007	.1950	10.06	4.354	0.0000	0.000	7.
20.	-83.6	.2317	.007	.0304	.008	.2013	2.84	2.121	0.0000	0.000	5.
10.	-80.2	.2281	.016	.0179	.009	.2102	-14.26	25.099	0.0000	0.000	4.

BYRD 1963 JULY AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
800.	-37.9	.2550	.024	.2352	.032	.0198	0.00	0.000	.1079	.110	4.
750.	-32.2	.2417	.028	.1972	.032	.0445	1.37	1.920	.2503	.148	10.
700.	-32.6	.2506	.028	.1896	.034	.0610	1.95	1.054	.2577	.162	10.
650.	-34.2	.2551	.027	.1809	.033	.0742	1.55	1.367	.2291	.145	10.
600.	-36.6	.2556	.028	.1715	.031	.0841	1.17	.668	.1722	.109	10.
550.	-39.6	.2537	.026	.1601	.028	.0936	1.12	.347	.0805	.103	10.
500.	-43.5	.2488	.023	.1451	.025	.1036	1.18	.422	.0194	.061	10.
450.	-47.9	.2441	.021	.1299	.020	.1142	1.25	.656	0.0000	0.000	10.
400.	-52.8	.2371	.021	.1140	.016	.1231	1.04	.671	0.0000	0.000	10.
350.	-57.4	.2281	.017	.1005	.013	.1276	.53	.663	0.0000	0.000	10.
300.	-63.0	.2203	.015	.0879	.008	.1324	.57	.412	0.0000	0.000	10.
250.	-67.7	.2094	.011	.0785	.007	.1309	-.18	.724	0.0000	0.000	10.
200.	-70.7	.1989	.010	.0688	.010	.1302	-.08	.578	0.0000	0.000	10.
150.	-73.3	.1925	.011	.0631	.011	.1294	-.09	.723	0.0000	0.000	10.
100.	-78.9	.1881	.012	.0569	.010	.1312	.21	1.637	0.0000	0.000	10.
80.	-80.7	.1880	.012	.0492	.011	.1388	3.12	2.482	0.0000	0.000	9.
60.	-83.3	.1892	.012	.0460	.012	.1432	2.66	4.842	0.0000	0.000	7.
50.	-84.4	.1919	.013	.0403	.012	.1516	4.90	4.825	0.0000	0.000	7.
40.	-85.1	.1995	.008	.0335	.016	.1659	5.12	4.537	0.0000	0.000	6.
30.	-86.6	.1902	.008	.0285	.012	.1617	-2.47	10.850	0.0000	0.000	3.

BYRD 1963 AUGUST AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
800.	-31.0	.2667	.048	.2561	.052	.0107	0.00	0.000	.4015	.345	9.
750.	-26.2	.2639	.053	.2363	.063	.0275	1.98	1.209	.4434	.335	9.
700.	-27.8	.2714	.046	.2309	.060	.0405	1.52	.783	.3879	.259	9.
650.	-29.7	.2740	.041	.2128	.053	.0612	2.44	1.773	.2892	.209	9.
600.	-33.2	.2749	.034	.1966	.052	.0783	2.02	1.740	.2035	.156	9.
550.	-37.3	.2703	.030	.1723	.035	.0980	2.32	2.022	.1422	.135	9.
500.	-41.9	.2650	.028	.1505	.028	.1146	1.94	1.575	.0502	.081	9.
450.	-46.7	.2575	.025	.1343	.024	.1233	1.03	.533	0.0000	0.000	9.
400.	-51.7	.2488	.023	.1172	.021	.1315	.97	.596	0.0000	0.000	9.
350.	-57.3	.2395	.022	.1000	.015	.1396	.94	.584	0.0000	0.000	9.
300.	-63.5	.2285	.024	.0850	.009	.1435	.46	.601	0.0000	0.000	9.
250.	-69.7	.2171	.025	.0722	.007	.1449	.17	.384	0.0000	0.000	9.
200.	-75.1	.2062	.024	.0613	.006	.1450	0.00	.530	0.0000	0.000	9.
150.	-79.2	.1977	.023	.0479	.007	.1498	.58	.440	0.0000	0.000	9.
100.	-83.5	.1927	.020	.0394	.008	.1532	.40	1.507	0.0000	0.000	9.
80.	-85.9	.1920	.022	.0354	.006	.1566	.31	2.103	0.0000	0.000	8.
60.	-88.3	.2015	.021	.0321	.006	.1694	-.76	4.113	0.0000	0.000	6.
50.	-89.4	.2008	.023	.0307	.008	.1701	.41	3.549	0.0000	0.000	6.
40.	-89.7	.2026	.025	.0269	.011	.1758	8.4814	.623	0.0000	0.000	5.
30.	-89.7	.2099	.018	.0257	.007	.1842	17.4916	.178	0.0000	0.000	3.
20.	-87.7	.2070	.010	.0275	.003	.1795	5.56	5.597	0.0000	0.000	2.

HALLETT 1963 MARCH AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
1000.	-13.4	.4493	0.000	.4422	0.000	.0071	0.00	0.000	.0363	0.000	1.
950.	-14.0	.4218	.019	.3925	.010	.0293	.25	.494	.9116	.341	4.
900.	-15.3	.4123	.016	.3646	.018	.0477	2.16	1.894	.8908	.290	4.
850.	-16.5	.3992	.019	.3481	.027	.0510	.39	.791	.7824	.249	4.
800.	-17.8	.3865	.027	.3296	.025	.0569	.69	.959	.7344	.196	4.
750.	-18.2	.3746	.025	.2970	.024	.0776	2.44	2.571	.6245	.316	4.
700.	-19.8	.3688	.021	.2751	.025	.0937	1.89	1.483	.4382	.328	4.
650.	-22.2	.3626	.018	.2607	.026	.1019	.97	.673	.4302	.290	4.
600.	-25.1	.3540	.019	.2472	.027	.1068	.58	.359	.3432	.240	4.
550.	-28.7	.3475	.018	.2298	.027	.1177	1.28	.645	.2612	.189	4.
500.	-32.2	.3390	.018	.2125	.025	.1265	1.03	.501	.2034	.116	4.
450.	-36.8	.3301	.019	.1904	.026	.1397	1.55	.299	.1761	.138	4.
400.	-42.5	.3160	.020	.1640	.016	.1520	1.45	.978	.0557	.111	4.
350.	-48.9	.3000	.022	.1333	.010	.1667	1.73	.675	0.0000	0.000	4.
300.	-53.3	.2787	.024	.1051	.005	.1736	.95	.208	0.0000	0.000	3.
250.	-48.5	.2659	.019	.0885	.007	.1774	.45	.379	0.0000	0.000	3.
200.	-46.5	.2714	.018	.0846	.004	.1868	1.11	.154	0.0000	0.000	3.
150.	-48.6	.2767	.017	.0827	.005	.1940	.85	.689	0.0000	0.000	3.
100.	-50.6	.2732	.010	.0758	.008	.1975	.40	1.465	0.0000	0.000	3.
80.	-51.2	.2786	.007	.0818	.015	.1968	-3.31	9.433	0.0000	0.000	3.
60.	-52.9	.2716	.014	.0640	.008	.2076	5.52	6.274	0.0000	0.000	3.
50.	-54.3	.2748	.017	.0595	.005	.2153	4.54	4.257	0.0000	0.000	3.
40.	-54.6	.2714	.018	.0547	.006	.2166	.80	3.677	0.0000	0.000	3.
30.	-54.7	.2692	.021	.0470	.009	.2221	4.81	2.191	0.0000	0.000	3.
20.	-56.0	.2867	.001	.0465	.006	.2402	19.1510	.063	0.0000	0.000	2.
10.	-57.7	.2908	0.000	.0286	0.000	.2622	.59	0.000	0.0000	0.000	1.

HALLETT 1963 APRIL AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
950.	-18.5	.3672	.035	.3242	.035	.0430	0.00	0.000	.6059	.286	9.
900.	-19.2	.3622	.033	.2998	.030	.0624	2.29	.686	.5555	.228	9.
850.	-19.5	.3565	.032	.2830	.032	.0735	1.30	.792	.5695	.222	9.
800.	-20.4	.3541	.029	.2697	.033	.0844	1.28	1.073	.5361	.260	9.
750.	-21.6	.3508	.027	.2567	.036	.0941	1.15	.835	.5374	.307	9.
700.	-23.9	.3474	.027	.2462	.039	.1012	.84	.830	.4103	.295	9.
650.	-26.4	.3430	.026	.2307	.035	.1123	1.30	.857	.2704	.292	9.
600.	-29.9	.3390	.024	.2137	.029	.1253	1.53	1.592	.1989	.228	9.
550.	-34.2	.3310	.024	.1948	.025	.1362	1.28	.607	.1565	.137	9.
500.	-38.5	.3214	.022	.1754	.023	.1460	1.16	.565	.0604	.096	9.
450.	-43.2	.3137	.019	.1566	.022	.1571	1.31	.456	0.0000	0.000	9.
400.	-48.3	.3045	.019	.1407	.021	.1637	.77	.349	0.0000	0.000	9.
350.	-53.4	.2919	.020	.1242	.018	.1677	.47	.597	0.0000	0.000	9.
300.	-56.5	.2757	.023	.1047	.007	.1710	.39	.691	0.0000	0.000	9.
250.	-50.8	.2633	.026	.0873	.006	.1760	.59	.347	0.0000	0.000	9.
200.	-50.7	.2680	.026	.0880	.006	.1800	.47	.685	0.0000	0.000	9.
150.	-50.6	.2655	.028	.0821	.006	.1834	.45	.489	0.0000	0.000	8.
100.	-53.5	.2683	.027	.0737	.006	.1946	1.32	.584	0.0000	0.000	8.
80.	-54.2	.2689	.026	.0704	.006	.1985	.80	1.181	0.0000	0.000	8.
60.	-56.3	.2707	.024	.0626	.007	.2081	3.23	3.445	0.0000	0.000	8.
50.	-56.2	.2815	.017	.0613	.005	.2202	2.38	3.355	0.0000	0.000	6.
40.	-56.8	.2840	.019	.0567	.006	.2272	6.0712	.253	0.0000	0.000	5.
30.	-58.1	.2909	.024	.0517	.006	.2392	4.35	6.143	0.0000	0.000	3.
20.	-58.9	.2864	.029	.0526	.011	.2338	4.2111	.890	0.0000	0.000	3.
10.	-59.4	.3318	0.000	.0272	0.000	.3046	24.38	0.000	0.0000	0.000	1.

HALLETT 1963 MAY AVERAGE											
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
1000.	-18.9	.3676	.009	.3626	.019	.0050	0.00	0.000	.5812	.155	2.
950.	-22.7	.3409	.023	.2997	.043	.0412	.12	.273	.4129	.186	10.
900.	-22.9	.3381	.021	.2801	.044	.0580	1.57	1.082	.4150	.202	11.
850.	-23.4	.3372	.021	.2682	.047	.0689	1.29	1.381	.3826	.225	11.
800.	-23.4	.3355	.022	.2588	.049	.0767	.91	.947	.3764	.253	11.
750.	-23.2	.3334	.024	.2483	.048	.0851	.99	.741	.4391	.420	11.
700.	-25.0	.3350	.028	.2394	.049	.1357	1.24	.974	.4375	.450	11.
650.	-27.5	.3335	.030	.2290	.051	.1045	1.03	.590	.4166	.420	11.
600.	-30.5	.3308	.030	.2179	.054	.1130	1.00	.592	.3000	.356	11.
550.	-34.5	.3251	.030	.2039	.056	.1212	.97	.425	.1773	.235	11.
500.	-39.6	.3171	.027	.1844	.050	.1328	1.36	1.204	.0787	.176	11.
450.	-44.6	.3081	.025	.1636	.046	.1445	1.38	1.429	.0589	.110	11.
400.	-51.3	.2902	.019	.1408	.039	.1494	.65	.615	0.0000	0.000	10.
350.	-56.9	.2760	.021	.1189	.032	.1571	.91	.366	0.0000	0.000	10.
300.	-62.3	.2626	.024	.0938	.010	.1688	.43	.472	0.0000	0.000	9.
250.	-61.0	.2407	.022	.0763	.008	.1645	0.00	.626	0.0000	0.000	8.
200.	-59.5	.2380	.019	.0705	.005	.1675	.36	.624	0.0000	0.000	8.
150.	-60.2	.2427	.019	.0655	.007	.1773	1.15	.551	0.0000	0.000	8.
100.	-62.6	.2427	.022	.0587	.006	.1840	1.05	.420	0.0000	0.000	7.
80.	-64.7	.2422	.025	.0555	.005	.1867	.98	1.537	0.0000	0.000	6.
60.	-67.3	.2557	.014	.0471	.005	.2086	2.62	3.319	0.0000	0.000	3.
50.	-66.3	.2527	.018	.0495	0.000	.2032	-.21	.435	0.0000	0.000	2.
40.	-68.8	.2582	.020	.0474	.002	.2108	7.52	.146	0.0000	0.000	2.
30.	-71.7	.2689	0.000	.0430	0.000	.2258	1.89	0.000	0.0000	0.000	1.

HALLETT 1963 JUNE AVERAGE											
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
950.	-23.5	.3282	.027	.2882	.043	.0400	.10	.305	.3709	.183	10.
900.	-24.2	.3269	.025	.2699	.040	.0570	1.99	1.050	.3646	.196	10.
850.	-25.7	.3260	.025	.2547	.038	.0712	1.68	1.138	.3312	.252	10.
800.	-26.5	.3226	.027	.2404	.037	.0821	1.28	1.176	.3233	.247	10.
750.	-27.4	.3196	.028	.2308	.038	.0888	.78	.511	.2900	.219	10.
700.	-28.4	.3162	.028	.2198	.038	.0964	.89	.388	.2562	.177	10.
650.	-30.5	.3140	.025	.2053	.032	.1087	1.45	1.075	.1817	.182	10.
600.	-33.5	.3107	.023	.1893	.027	.1213	1.48	1.146	.1247	.143	10.
550.	-36.8	.3066	.021	.1741	.025	.1325	1.32	.331	.0582	.098	10.
500.	-41.0	.3010	.018	.1571	.019	.1439	1.35	.438	.0256	.054	10.
450.	-45.3	.2944	.016	.1384	.015	.1560	1.42	.612	0.0000	0.000	10.
400.	-50.0	.2866	.013	.1239	.012	.1627	.79	.298	0.0000	0.000	10.
350.	-54.7	.2778	.014	.1093	.008	.1685	.69	.513	0.0000	0.000	10.
300.	-58.8	.2682	.012	.0962	.005	.1720	.41	.534	0.0000	0.000	10.
250.	-61.7	.2562	.015	.0858	.005	.1705	-.13	.657	0.0000	0.000	9.
200.	-62.0	.2480	.018	.0751	.007	.1729	.28	.562	0.0000	0.000	9.
150.	-64.2	.2457	.019	.0695	.007	.1762	.40	.330	0.0000	0.000	9.
100.	-69.0	.2436	.019	.0610	.007	.1826	.70	.194	0.0000	0.000	8.
80.	-71.3	.2448	.015	.0551	.007	.1897	1.91	2.663	0.0000	0.000	6.
60.	-73.9	.2390	.014	.0499	.010	.1891	-.28	6.889	0.0000	0.000	4.
50.	-71.9	.2556	.005	.0480	.013	.2076	4.73	2.697	0.0000	0.000	2.
40.	-73.4	.2482	.017	.0488	.015	.1994	-3.58	9.474	0.0000	0.000	2.
30.	-74.2	.2542	.010	.0395	.013	.2147	7.18	4.500	0.0000	0.000	2.

HALLETT 1963 JULY AVERAGE											
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
950.	-22.9	.3318	.031	.2838	.034	.0480	0.00	0.000	.3129	.100	9.
900.	-23.9	.3314	.030	.2654	.039	.0660	2.12	1.572	.2756	.134	9.
850.	-24.5	.3283	.028	.2535	.039	.0748	1.03	.713	.2756	.117	9.
800.	-23.2	.3233	.026	.2386	.030	.0847	1.16	1.244	.3010	.220	9.
750.	-24.7	.3251	.019	.2315	.034	.0936	1.06	.968	.2683	.183	9.
700.	-26.0	.3224	.016	.2227	.037	.0998	.72	.271	.2622	.223	9.
650.	-28.7	.3211	.015	.2137	.039	.1074	.90	.362	.1965	.203	9.
600.	-32.0	.3173	.015	.2015	.040	.1158	1.00	.633	.1343	.151	9.
550.	-35.4	.3109	.015	.1876	.039	.1233	.88	.571	.0847	.113	9.
500.	-39.9	.3042	.016	.1694	.035	.1348	1.35	.818	.0357	.068	9.
450.	-45.0	.2960	.016	.1499	.031	.1460	1.32	.944	0.0000	0.000	9.
400.	-50.8	.2855	.018	.1293	.023	.1562	1.19	1.046	0.0000	0.000	9.
350.	-56.8	.2711	.025	.1040	.007	.1671	1.28	1.089	0.0000	0.000	9.
300.	-62.6	.2622	.025	.0906	.008	.1716	.53	.427	0.0000	0.000	9.
250.	-67.7	.2554	.022	.0826	.009	.1728	-.11	.591	0.0000	0.000	8.
200.	-68.9	.2459	.020	.0724	.008	.1735	.09	.778	0.0000	0.000	8.
150.	-70.8	.2405	.020	.0709	.009	.1696	-.07	.728	0.0000	0.000	7.
100.	-75.2	.2445	.018	.0621	.012	.1824	1.52	1.008	0.0000	0.000	7.
80.	-77.4	.2461	.018	.0584	.012	.1877	.42	3.060	0.0000	0.000	7.
60.	-79.8	.2439	.017	.0559	.014	.1880	3.34	2.974	0.0000	0.000	4.
50.	-80.5	.2456	.018	.0544	.012	.1912	1.91	2.130	0.0000	0.000	4.
40.	-82.1	.2509	.019	.0646	.024	.1863	-1.79	.309	0.0000	0.000	2.
30.	-83.4	.2557	.027	.0640	.021	.1917	4.92	6.884	0.0000	0.000	2.
20.	-82.0	.2580	.015	.0559	.003	.2191	4.60	6.359	0.0000	0.000	2.

HALLETT 1963 AUGUST AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
1000.	-19.5	.3684	.035	.3491	.052	.0193	0.00	0.000	.4741	.169	6.
950.	-20.5	.3426	.039	.3058	.063	.0367	.75	1.160	.3664	.137	9.
900.	-21.9	.3405	.032	.2948	.059	.0457	1.06	.781	.3474	.120	9.
850.	-22.9	.3380	.028	.2859	.055	.0521	.75	.439	.2976	.193	9.
800.	-23.3	.3341	.027	.2769	.058	.0572	.59	.647	.2751	.259	9.
750.	-24.0	.3298	.019	.2679	.058	.0619	.56	.952	.3420	.257	9.
700.	-24.8	.3261	.018	.2569	.061	.0692	.86	.846	.4181	.304	9.
650.	-26.9	.3238	.019	.2427	.059	.0810	1.39	.579	.3947	.332	9.
600.	-30.1	.3210	.019	.2252	.054	.0958	1.74	.869	.3309	.287	9.
550.	-34.1	.3161	.019	.2068	.050	.1093	1.59	.701	.2223	.248	9.
500.	-38.5	.3070	.018	.1881	.049	.1188	1.12	.670	.1379	.174	9.
450.	-44.1	.2962	.019	.1682	.043	.1280	1.08	.549	.0562	.094	9.
400.	-50.5	.2836	.019	.1459	.035	.1377	1.14	.977	0.0000	0.000	9.
350.	-56.6	.2681	.020	.1204	.030	.1478	1.18	1.485	0.0000	0.000	9.
300.	-62.3	.2517	.017	.0998	.022	.1518	.48	.457	0.0000	0.000	9.
250.	-68.0	.2348	.019	.0821	.013	.1528	.11	.679	0.0000	0.000	9.
200.	-71.3	.2176	.025	.0673	.006	.1502	-.19	.372	0.0000	0.000	8.
150.	-73.6	.2161	.020	.0621	.005	.1540	-.27	.959	0.0000	0.000	7.
100.	-78.0	.2061	.022	.0537	.003	.1524	.20	.868	0.0000	0.000	6.
80.	-79.3	.2037	.026	.0480	.003	.1557	1.42	2.671	0.0000	0.000	6.
60.	-81.0	.2048	.030	.0418	.002	.1630	2.18	4.177	0.0000	0.000	5.
50.	-82.3	.2033	.034	.0382	.005	.1652	1.30	3.851	0.0000	0.000	5.
40.	-82.0	.2229	.021	.0381	.003	.1848	.48	7.577	0.0000	0.000	3.
30.	-80.7	.2254	.024	.0362	.001	.1892	8.72	5.560	0.0000	0.000	2.
20.	-79.7	.2561	0.000	.0307	0.000	.2253	22.18	0.000	0.0000	0.000	1.
10.	-81.1	.2680	0.000	.0278	0.000	.2402	9.41	0.000	0.0000	0.000	1.

HALLETT 1963 SEPTEMBER AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
1000.	-20.8	.3500	.027	.3213	.004	.0286	0.00	0.000	.1910	.270	2.
950.	-22.0	.3312	.024	.2848	.012	.0464	.91	1.632	.3913	.224	7.
900.	-22.5	.3315	.023	.2628	.010	.0686	2.62	.736	.3492	.103	7.
850.	-23.8	.3308	.021	.2477	.011	.0831	1.70	1.167	.2359	.112	7.
800.	-24.9	.3277	.019	.2355	.013	.0922	1.08	.635	.1751	.127	7.
750.	-25.1	.3230	.021	.2236	.015	.0995	.85	.523	.1661	.122	7.
700.	-26.3	.3204	.025	.2123	.017	.1080	1.01	.649	.1188	.163	7.
650.	-29.2	.3194	.023	.2014	.016	.1180	1.18	.601	.1137	.159	7.
600.	-32.5	.3155	.023	.1894	.016	.1261	.95	.621	.0871	.121	7.
550.	-36.2	.3112	.023	.1760	.017	.1352	1.07	.864	.0528	.082	7.
500.	-40.3	.3039	.024	.1602	.018	.1437	.99	.508	.0062	.016	7.
450.	-45.0	.2937	.029	.1405	.012	.1533	1.13	.523	0.0000	0.000	7.
400.	-49.8	.2835	.030	.1224	.012	.1611	.92	.366	0.0000	0.000	7.
350.	-55.8	.2764	.030	.1088	.012	.1677	.78	.314	0.0000	0.000	7.
300.	-61.5	.2664	.030	.0952	.011	.1712	.42	.536	0.0000	0.000	7.
250.	-67.6	.2585	.031	.0848	.009	.1738	.31	.360	0.0000	0.000	7.
200.	-69.8	.2461	.029	.0722	.008	.1739	0.00	.534	0.0000	0.000	7.
150.	-71.9	.2269	.025	.0712	.007	.1557	.27	.313	0.0000	0.000	4.
100.	-74.6	.2339	.002	.0592	.006	.1747	.64	.190	0.0000	0.000	2.
80.	-80.3	.2368	0.000	.0537	0.000	.1832	.49	0.000	0.0000	0.000	1.
60.	-82.3	.2392	0.000	.0482	0.000	.1910	.34	0.000	0.0000	0.000	1.
50.	-82.2	.2392	0.000	.0379	0.000	.2014	6.09	0.000	0.0000	0.000	1.
40.	-82.7	.2511	0.000	.0434	0.000	.2077	1.53	0.000	0.0000	0.000	1.
30.	-82.9	.2447	0.000	.0454	0.000	.1992	-3.92	0.000	0.0000	0.000	1.
20.	-80.1	.2624	0.000	.0391	0.000	.2233	25.79	0.000	0.0000	0.000	1.
10.	-70.2	.2846	0.000	.0303	0.000	.2543	-10.00	0.000	0.0000	0.000	1.

HALLETT 1963 OCTOBER AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
950.	-19.8	.3575	.033	.3080	.040	.0495	0.00	0.000	.3543	.134	8.
900.	-21.1	.3503	.029	.2885	.038	.0618	1.45	.809	.3492	.122	8.
850.	-23.8	.3417	.028	.2730	.032	.0687	.81	1.174	.3021	.105	8.
800.	-25.8	.3318	.029	.2520	.024	.0798	1.30	1.349	.2689	.104	8.
750.	-27.5	.3235	.027	.2312	.020	.0923	1.47	1.871	.2376	.094	8.
700.	-29.3	.3170	.025	.2155	.020	.1015	1.09	.699	.2245	.077	8.
650.	-31.8	.3107	.024	.2021	.022	.1085	.82	.256	.1802	.064	8.
600.	-35.0	.3033	.024	.1879	.023	.1154	.81	.362	.1070	.063	8.
550.	-38.5	.2949	.022	.1723	.026	.1226	.85	.537	.0208	.043	8.
500.	-42.8	.2864	.020	.1543	.024	.1320	1.10	.547	0.0000	0.000	8.
450.	-47.3	.2771	.019	.1341	.012	.1430	1.29	.949	0.0000	0.000	8.
400.	-52.0	.2672	.018	.1188	.008	.1484	.64	.755	0.0000	0.000	8.
350.	-57.0	.2561	.016	.1070	.008	.1492	.09	.285	0.0000	0.000	8.
300.	-62.0	.2425	.010	.0968	.009	.1457	.16	.344	0.0000	0.000	7.
250.	-64.9	.2341	.009	.0887	.008	.1453	-.08	.511	0.0000	0.000	6.
200.	-68.4	.2247	.006	.0817	.006	.1430	-.46	.613	0.0000	0.000	5.
150.	-70.5	.2228	.007	.0735	.009	.1493	.41	.565	0.0000	0.000	3.
100.	-70.5	.2235	.007	.0696	.008	.1539	.54	.235	0.0000	0.000	3.
80.	-70.0	.2239	.010	.0667	.008	.1572	2.41	2.075	0.0000	0.000	3.
60.	-69.7	.2271	.013	.0656	.010	.1614	.91	2.275	0.0000	0.000	3.
50.	-69.0	.2283	.011	.0638	.007	.1645	1.79	3.553	0.0000	0.000	3.
40.	-68.0	.2291	.013	.0646	.007	.1645	-1.85	4.189	0.0000	0.000	3.
30.	-64.7	.2272	0.000	.0632	0.000	.1639	13.06	0.000	0.0000	0.000	1.

AMUNDSEN-SCOTT 1963 MARCH					AVERAGE						
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
650.	-45.6	.1629	.009	.1473	.036	.0156	0.00	0.000	0.0000	0.000	2.
600.	-38.3	.1749	.005	.1464	.023	.0285	.85	.802	.0977	.025	3.
550.	-39.9	.1957	.004	.1526	.018	.0431	1.72	.772	.0571	.090	3.
500.	-42.6	.2115	.010	.1500	.017	.0615	2.16	1.052	.0335	.058	3.
450.	-45.9	.2140	.012	.1417	.016	.0723	1.27	.834	0.0000	0.000	3.
400.	-50.0	.2142	.012	.1296	.010	.0846	1.45	.617	0.0000	0.000	3.
350.	-53.8	.2121	.007	.1200	.006	.0921	.88	.142	0.0000	0.000	3.
300.	-54.3	.2036	.003	.1086	.006	.0950	.34	.420	0.0000	0.000	3.
250.	-49.2	.1982	.003	.0971	.004	.1011	.72	.292	0.0000	0.000	3.
200.	-48.5	.2037	.004	.0975	.004	.1063	.61	.591	0.0000	0.000	3.
150.	-49.4	.2103	.004	.0948	.006	.1155	1.09	.658	0.0000	0.000	3.
100.	-51.5	.2176	.006	.0884	.011	.1292	1.62	.184	0.0000	0.000	3.
80.	-52.7	.2206	.015	.0852	.008	.1354	3.29	3.230	0.0000	0.000	3.
60.	-54.6	.2215	.011	.0831	.014	.1384	1.28	3.022	0.0000	0.000	3.
50.	-55.7	.2268	.010	.0783	.012	.1485	5.94	.929	0.0000	0.000	3.
40.	-57.1	.2350	.008	.0815	.013	.1535	-.90	5.033	0.0000	0.000	3.
30.	-57.5	.2383	.019	.0816	.017	.1566	-.40	5.676	0.0000	0.000	2.
20.	-56.5	.2610	.014	.0842	.021	.1768	20.75	1.049	0.0000	0.000	2.

AMUNDSEN-SCOTT 1963 APRIL					AVERAGE						
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
650.	-43.1	.2017	.055	.1748	.061	.0268	0.00	0.000	.0455	.064	9.
600.	-39.5	.1973	.037	.1587	.042	.0386	1.39	1.182	.0646	.078	9.
550.	-41.6	.2044	.026	.1539	.031	.0505	1.39	.481	.0372	.062	9.
500.	-44.6	.2096	.025	.1453	.028	.0643	1.63	.850	0.0000	0.000	9.
450.	-48.1	.2077	.020	.1351	.024	.0726	.97	.435	0.0000	0.000	9.
400.	-52.9	.2040	.017	.1227	.017	.0814	1.03	.831	0.0000	0.000	9.
350.	-57.7	.1964	.016	.1078	.016	.0886	.85	.809	0.0000	0.000	9.
300.	-59.9	.1874	.014	.0933	.018	.0940	.64	.497	0.0000	0.000	9.
250.	-57.1	.1782	.011	.0830	.020	.0952	.13	.595	0.0000	0.000	9.
200.	-54.8	.1797	.008	.0770	.022	.1027	.89	.358	0.0000	0.000	9.
150.	-56.3	.1829	.009	.0726	.022	.1103	.89	.440	0.0000	0.000	9.
100.	-59.4	.1827	.009	.0657	.022	.1170	.79	.380	0.0000	0.000	9.
80.	-61.3	.1825	.010	.0609	.024	.1216	1.26	3.011	0.0000	0.000	9.
60.	-63.9	.1823	.009	.0548	.023	.1275	1.08	2.438	0.0000	0.000	9.
50.	-65.2	.1816	.010	.0518	.023	.1298	1.33	3.184	0.0000	0.000	9.
40.	-66.4	.1821	.010	.0476	.023	.1345	1.69	4.214	0.0000	0.000	9.
30.	-66.2	.1791	.009	.0461	.028	.1330	1.20	3.081	0.0000	0.000	7.
20.	-66.4	.1717	.008	.0552	.028	.1166	-5.472	1.615	0.0000	0.000	4.

AMUNDSEN-SCOTT 1963 MAY					AVERAGE						
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
650.	-40.0	.2540	.068	.2443	.063	.0097	0.00	0.000	.0888	.088	10.
600.	-37.0	.2361	.036	.2005	.036	.0356	3.05	2.507	.1506	.076	10.
550.	-39.7	.2399	.025	.1815	.029	.0584	2.68	1.152	.0927	.091	10.
500.	-43.2	.2393	.022	.1637	.023	.0756	2.02	.706	.0244	.047	10.
450.	-47.9	.2366	.020	.1438	.022	.0928	2.02	.550	0.0000	0.000	10.
400.	-53.3	.2295	.020	.1240	.021	.1055	1.49	.958	0.0000	0.000	10.
350.	-58.9	.2184	.018	.1057	.016	.1127	.85	.502	0.0000	0.000	10.
300.	-64.1	.2057	.017	.0847	.010	.1210	.98	.619	0.0000	0.000	10.
250.	-67.0	.1933	.017	.0681	.008	.1252	.49	.592	0.0000	0.000	10.
200.	-65.2	.1848	.015	.0571	.008	.1277	.30	.467	0.0000	0.000	10.
150.	-67.1	.1851	.014	.0529	.008	.1321	.52	.424	0.0000	0.000	10.
100.	-71.3	.1860	.013	.0447	.007	.1413	1.08	.676	0.0000	0.000	10.
80.	-74.1	.1850	.015	.0417	.007	.1433	1.23	2.840	0.0000	0.000	10.
60.	-77.0	.1824	.014	.0369	.005	.1455	1.65	4.345	0.0000	0.000	8.
50.	-78.8	.1822	.014	.0321	.008	.1501	2.69	2.705	0.0000	0.000	8.
40.	-80.0	.1810	.017	.0271	.007	.1539	4.23	7.809	0.0000	0.000	7.
30.	-79.9	.1825	.019	.0204	.010	.1621	2.65	5.476	0.0000	0.000	5.
20.	-79.3	.1902	.022	.0067	.015	.1835	-.66	3.080	0.0000	0.000	3.

AMUNDSEN-SCOTT 1963				JUNE	AVERAGE						
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
650.	-40.3	.2452	.039	.2116	.045	.0336	0.00	0.000	.1139	.170	9.
600.	-35.2	.2294	.036	.1814	.044	.0480	1.70	1.676	.2064	.129	9.
550.	-37.3	.2356	.029	.1660	.040	.0697	2.55	2.151	.1550	.126	9.
500.	-41.2	.2345	.026	.1540	.035	.0805	1.28	.954	.0725	.112	9.
450.	-45.8	.2311	.025	.1367	.033	.0944	1.64	.637	.0250	.075	9.
400.	-51.3	.2257	.026	.1220	.034	.1036	1.08	.641	0.0000	0.000	9.
350.	-57.8	.2170	.022	.1062	.033	.1108	.85	.554	0.0000	0.000	9.
300.	-64.0	.2051	.017	.0915	.029	.1136	.32	.466	0.0000	0.000	9.
250.	-70.1	.1903	.011	.0767	.020	.1136	0.00	.628	0.0000	0.000	9.
200.	-72.4	.1782	.016	.0605	.010	.1178	.49	.585	0.0000	0.000	9.
150.	-73.3	.1730	.018	.0496	.008	.1234	.66	.875	0.0000	0.000	9.
100.	-77.6	.1721	.018	.0434	.004	.1286	.61	.861	0.0000	0.000	9.
80.	-80.0	.1712	.019	.0375	.006	.1336	1.79	2.489	0.0000	0.000	9.
60.	-83.5	.1721	.018	.0320	.009	.1401	1.96	3.933	0.0000	0.000	9.
50.	-85.1	.1761	.011	.0280	.009	.1480	2.47	5.122	0.0000	0.000	8.
40.	-85.4	.1798	.016	.0190	.009	.1609	8.45	4.566	0.0000	0.000	5.
30.	-86.7	.1736	.017	.0170	.019	.1566	-1.89	1.484	0.0000	0.000	2.
20.	-81.1	.1898	0.000	.0276	0.000	.1621	15.13	0.000	0.0000	0.000	1.

AMUNDSEN-SCOTT 1963				JULY	AVERAGE						
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
650.	-46.6	.2762	.044	.2309	.040	.0452	0.00	0.000	.0483	.090	8.
600.	-39.4	.2225	.052	.1677	.028	.0547	1.12	.900	.0889	.102	8.
550.	-41.6	.2192	.045	.1495	.022	.0697	1.76	.786	.0547	.085	8.
500.	-44.5	.2134	.040	.1369	.019	.0765	.80	.476	.0157	.044	8.
450.	-48.7	.2087	.041	.1237	.016	.0850	1.00	.444	0.0000	0.000	8.
400.	-53.9	.2039	.038	.1100	.016	.0939	1.04	.809	0.0000	0.000	8.
350.	-59.3	.1951	.037	.0980	.015	.0971	.37	.881	0.0000	0.000	8.
300.	-64.9	.1874	.035	.0871	.015	.1003	.38	.276	0.0000	0.000	8.
250.	-69.5	.1754	.033	.0739	.017	.1015	.22	.538	0.0000	0.000	8.
200.	-72.7	.1654	.029	.0659	.015	.0995	-.24	.818	0.0000	0.000	8.
150.	-75.7	.1628	.027	.0580	.018	.1049	.63	.938	0.0000	0.000	8.
100.	-80.9	.1589	.027	.0498	.018	.1091	.50	1.092	0.0000	0.000	8.
80.	-83.4	.1589	.032	.0429	.021	.1160	3.46	4.343	0.0000	0.000	7.
60.	-86.4	.1600	.039	.0334	.028	.1267	4.38	6.700	0.0000	0.000	6.
50.	-87.4	.1606	.045	.0315	.037	.1291	2.86	.699	0.0000	0.000	4.
40.	-88.4	.1577	.043	.0305	.035	.1273	.36	.997	0.0000	0.000	4.

AMUNDSEN-SCOTT 1963				AUGUST	AVERAGE						
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
650.	-37.3	.2118	.066	.1863	.069	.0255	0.00	0.000	.1283	.116	10.
600.	-36.3	.2141	.047	.1746	.054	.0395	1.65	2.274	.1674	.108	10.
550.	-39.7	.2210	.038	.1652	.043	.0558	1.91	1.132	.0796	.105	10.
500.	-44.1	.2220	.032	.1507	.036	.0713	1.83	1.073	.0244	.052	10.
450.	-48.8	.2197	.027	.1321	.030	.0876	1.92	.733	0.0000	0.000	10.
400.	-54.0	.2131	.025	.1135	.027	.0996	1.41	.529	0.0000	0.000	10.
350.	-60.0	.2039	.021	.0959	.019	.1080	.99	.891	0.0000	0.000	10.
300.	-66.7	.1938	.018	.0810	.012	.1129	.57	.667	0.0000	0.000	10.
250.	-72.6	.1813	.013	.0666	.009	.1147	.22	.635	0.0000	0.000	10.
200.	-76.6	.1707	.010	.0589	.007	.1118	-.35	.696	0.0000	0.000	10.
150.	-80.0	.1644	.009	.0514	.007	.1131	.15	.746	0.0000	0.000	10.
100.	-84.6	.1582	.012	.0402	.007	.1180	.58	.737	0.0000	0.000	10.
80.	-86.7	.1583	.011	.0402	.008	.1181	.89	3.936	0.0000	0.000	8.
60.	-88.1	.1573	.009	.0289	.006	.1284	1.39	2.850	0.0000	0.000	5.
50.	-89.6	.1533	.004	.0280	.010	.1253	-2.53	5.050	0.0000	0.000	3.

AMUNDSEN-SCOTT 1963 SEPTEMBER AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
650.	-40.8	.2707	.037	.2302	.039	.0404	0.00	0.000	.0611	.067	4.
600.	-38.6	.2394	.019	.1801	.025	.0594	2.23	1.407	.1061	.078	4.
550.	-41.0	.2330	.013	.1562	.020	.0768	2.05	.471	.0434	.057	4.
500.	-44.9	.2262	.011	.1391	.015	.0871	1.22	.594	0.0000	0.000	4.
450.	-50.3	.2207	.012	.1215	.016	.0992	1.42	.305	0.0000	0.000	4.
400.	-55.8	.2133	.012	.1057	.012	.1076	.99	.486	0.0000	0.000	4.
350.	-62.2	.2044	.009	.0894	.005	.1151	.88	.485	0.0000	0.000	4.
300.	-67.5	.1923	.009	.0768	.003	.1155	.05	.229	0.0000	0.000	4.
250.	-71.8	.1839	.005	.0670	.002	.1169	.17	.355	0.0000	0.000	4.
200.	-75.9	.1783	.006	.0584	.002	.1199	.34	.390	0.0000	0.000	4.
150.	-78.5	.1695	.006	.0530	.004	.1165	-.39	.484	0.0000	0.000	4.
100.	-82.3	.1664	.005	.0429	.002	.1235	.82	1.153	0.0000	0.000	4.
80.	-84.6	.1604	.002	.0399	.001	.1205	-.50	3.536	0.0000	0.000	3.
60.	-86.5	.1597	.007	.0374	.005	.1223	1.84	5.425	0.0000	0.000	3.
50.	-82.9	.1654	0.000	.0283	0.000	.1372	7.08	0.000	0.0000	0.000	1.
40.	-85.2	.1664	0.000	.0297	0.000	.1367	.84	0.000	0.0000	0.000	1.
30.	-83.8	.1721	0.000	.0174	0.000	.1548	10.64	0.000	0.0000	0.000	1.

WILKES 1963 MARCH AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
950.	-6.1	.5100	.026	.4294	.077	.0806	0.00	0.000	1.1570	.613	3.
900.	-10.3	.4630	.013	.3793	.040	.0837	.37	3.672	.9930	.425	3.
850.	-14.1	.4356	.015	.3495	.037	.0860	.28	1.016	.8828	.308	3.
800.	-16.9	.4106	.021	.3198	.028	.0908	.56	.469	.8387	.248	3.
750.	-19.1	.3932	.024	.2833	.009	.1099	2.25	2.896	.8140	.213	3.
700.	-22.2	.3816	.019	.2501	.005	.1315	2.54	1.165	.6327	.171	3.
650.	-25.8	.3641	.012	.2289	.031	.1352	.45	3.769	.4449	.090	3.
600.	-30.2	.3487	.012	.2261	.067	.1227	-1.48	4.739	.1657	.166	3.
550.	-34.5	.3391	.014	.2141	.074	.1251	.28	.853	.0938	.162	3.
500.	-38.6	.3309	.014	.1917	.067	.1392	1.66	.793	.0767	.133	3.
450.	-42.7	.3212	.009	.1704	.062	.1508	1.36	1.125	.0329	.057	3.
400.	-47.8	.3074	.010	.1505	.055	.1568	.71	.778	0.0000	0.000	3.
350.	-52.5	.2941	.006	.1347	.049	.1595	.31	1.237	0.0000	0.000	3.
300.	-53.4	.2800	.006	.1185	.056	.1615	.23	.415	0.0000	0.000	3.
250.	-51.3	.2796	.006	.1434	.107	.1362	-2.97	5.914	0.0000	0.000	3.
200.	-50.3	.2829	.006	.1404	.107	.1426	.75	.192	0.0000	0.000	3.
150.	-51.7	.2867	.009	.1358	.107	.1509	.99	.700	0.0000	0.000	3.
100.	-65.1	.2817	0.000	.2582	0.000	.0236	.43	0.000	0.0000	0.000	1.
80.	-61.8	.3105	0.000	.2228	0.000	.0877	15.41	0.000	0.0000	0.000	1.
60.	-56.7	.3454	0.000	.2019	0.000	.1435	16.51	0.000	0.0000	0.000	1.
50.	-52.9	.3716	0.000	.1718	0.000	.1999	33.20	0.000	0.0000	0.000	1.

WILKES 1963 APRIL AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
950.	-16.1	.4401	.038	.4006	.062	.0395	0.00	0.000	.4841	.230	8.
900.	-15.5	.4153	.039	.3502	.062	.0651	3.01	1.308	.4183	.226	8.
850.	-15.7	.3980	.041	.3202	.056	.0778	1.49	.767	.2777	.298	8.
800.	-17.4	.3881	.042	.2943	.049	.0938	1.88	1.405	.3504	.317	8.
750.	-19.1	.3795	.045	.2658	.046	.1137	2.34	2.550	.3211	.450	8.
700.	-22.0	.3717	.047	.2456	.044	.1261	1.46	.858	.2704	.383	8.
650.	-25.2	.3613	.045	.2259	.046	.1354	1.09	1.044	.2947	.396	8.
600.	-28.0	.3509	.043	.2087	.050	.1422	.80	.867	.2396	.394	8.
550.	-31.7	.3429	.043	.1929	.045	.1500	.92	.440	.1709	.328	8.
500.	-35.5	.3315	.040	.1742	.042	.1573	.86	.599	.1360	.213	8.
450.	-40.3	.3208	.037	.1555	.036	.1653	.94	.360	.0743	.146	8.
400.	-45.4	.3074	.035	.1354	.027	.1721	.80	.585	.0310	.088	8.
350.	-51.2	.2955	.030	.1193	.021	.1762	.49	.595	0.0000	0.000	8.
300.	-54.7	.2804	.028	.1022	.017	.1781	.23	.554	0.0000	0.000	8.
250.	-53.7	.2674	.024	.0871	.017	.1802	.25	.485	0.0000	0.000	8.
200.	-50.5	.2631	.025	.0813	.016	.1818	.19	.334	0.0000	0.000	8.
150.	-51.0	.2642	.026	.0772	.014	.1870	.61	.539	0.0000	0.000	8.
100.	-53.0	.2628	.025	.0723	.014	.1905	.41	1.219	0.0000	0.000	8.
80.	-54.3	.2654	.030	.0698	.013	.1956	1.79	1.867	0.0000	0.000	8.
60.	-55.1	.2729	.039	.0667	.013	.2061	3.29	3.614	0.0000	0.000	8.
50.	-56.1	.2783	.049	.0686	.021	.2097	2.07	4.142	0.0000	0.000	8.
40.	-56.5	.2814	.059	.0699	.031	.2115	2.10	4.820	0.0000	0.000	8.
30.	-58.1	.2695	.046	.0614	.027	.2081	1.15	9.335	0.0000	0.000	7.
20.	-57.1	.2854	.060	.0631	.032	.2222	21.45	12.001	0.0000	0.000	5.

WILKES 1963 MAY						AVERAGE					
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
1000.	-13.3	.4924	.036	.4814	.027	.0110	0.00	0.000	.9745	.407	4.
950.	-16.0	.4152	.038	.3765	.058	.0386	.54	1.554	.5380	.342	9.
900.	-16.1	.3914	.035	.3391	.065	.0523	1.61	1.212	.5773	.392	9.
850.	-16.7	.3781	.032	.3197	.066	.0584	.72	.880	.5515	.522	9.
800.	-17.7	.3676	.031	.3089	.067	.0587	.04	.727	.5658	.487	9.
750.	-18.4	.3608	.028	.2964	.071	.0644	.66	1.199	.6003	.546	9.
700.	-19.9	.3548	.023	.2891	.072	.0657	.15	.945	.6194	.633	9.
650.	-22.4	.3475	.022	.2780	.072	.0695	.45	.727	.5879	.608	9.
600.	-25.3	.3382	.023	.2608	.071	.0774	.93	.648	.5633	.521	9.
550.	-28.9	.3286	.025	.2421	.068	.0865	1.07	.898	.4176	.390	9.
500.	-33.4	.3169	.027	.2129	.060	.1040	2.06	1.861	.3042	.280	9.
450.	-38.0	.3045	.027	.1795	.053	.1250	2.47	1.635	.1957	.200	9.
400.	-43.4	.2924	.023	.1540	.043	.1384	1.58	1.237	.0857	.110	9.
350.	-49.0	.2797	.021	.1277	.032	.1520	1.59	.837	0.0000	0.000	9.
300.	-54.0	.2670	.017	.1057	.024	.1613	1.10	.793	0.0000	0.000	9.
250.	-56.9	.2549	.012	.0892	.016	.1656	.51	.762	0.0000	0.000	9.
200.	-57.6	.2447	.015	.0796	.010	.1651	-.07	.635	0.0000	0.000	9.
150.	-57.3	.2403	.020	.0730	.011	.1672	.26	.629	0.0000	0.000	9.
100.	-59.1	.2469	.019	.0690	.009	.1778	.29	.785	0.0000	0.000	6.
80.	-60.1	.2453	.022	.0604	.005	.1849	1.63	3.093	0.0000	0.000	6.
60.	-61.9	.2519	.018	.0607	.009	.1912	.11	2.863	0.0000	0.000	5.
50.	-63.1	.2571	.021	.0563	.012	.2008	5.62	4.883	0.0000	0.000	5.
40.	-64.7	.2655	.030	.0582	.012	.2072	6.93	1.980	0.0000	0.000	3.
30.	-65.0	.2421	0.000	.0413	0.000	.2008	-1.98	0.000	0.0000	0.000	1.
20.	-67.1	.2296	0.000	.0481	0.000	.1815	-15.97	0.000	0.0000	0.000	1.

WILKES 1963 JUNE						AVERAGE					
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
950.	-11.7	.4072	.027	.3200	.080	.0872	0.00	0.000	.9627	.933	7.
900.	-14.7	.3914	.018	.3195	.055	.0718	.19	8.141	.6938	.633	6.
850.	-15.8	.3790	.026	.2974	.063	.0816	1.15	1.448	.7891	.907	6.
800.	-17.8	.3687	.029	.2797	.061	.0890	.87	.907	.7042	.802	6.
750.	-18.9	.3572	.030	.2629	.060	.0944	.63	.999	.6184	.642	6.
700.	-21.8	.3499	.027	.2570	.060	.0930	-1.16	2.139	.4779	.565	6.
650.	-25.7	.3442	.025	.2448	.061	.0994	.75	1.343	.3223	.361	6.
600.	-29.0	.3313	.025	.2223	.051	.1090	1.13	1.534	.2731	.319	6.
550.	-33.1	.3190	.025	.2022	.045	.1169	.93	1.681	.1817	.207	6.
500.	-36.6	.3098	.024	.1781	.038	.1316	1.74	1.679	.1299	.149	6.
450.	-41.0	.2986	.024	.1590	.033	.1396	.94	.633	.0504	.094	6.
400.	-46.5	.2873	.027	.1400	.028	.1473	.90	.662	0.0000	0.000	6.
350.	-52.6	.2757	.027	.1214	.022	.1542	.82	.616	0.0000	0.000	6.
300.	-58.9	.2607	.027	.0991	.016	.1616	.87	.749	0.0000	0.000	6.
250.	-63.2	.2445	.027	.0830	.011	.1615	-.01	.598	0.0000	0.000	6.
200.	-63.8	.2324	.032	.0722	.009	.1602	-.15	.801	0.0000	0.000	6.
150.	-64.9	.2262	.031	.0661	.008	.1601	-.02	.754	0.0000	0.000	6.
100.	-68.5	.2207	.025	.0639	.006	.1568	-1.09	1.094	0.0000	0.000	5.
80.	-70.0	.2075	.014	.0622	.007	.1453	.59	2.969	0.0000	0.000	4.
60.	-72.5	.2067	.018	.0585	.010	.1481	-.30	4.894	0.0000	0.000	4.
50.	-72.4	.2201	.016	.0473	.014	.1728	2.14	5.197	0.0000	0.000	2.
40.	-73.4	.2212	.009	.0518	.017	.1695	-4.87	5.987	0.0000	0.000	2.
30.	-70.3	.2226	0.000	.0652	0.000	.1574	-.16	0.000	0.0000	0.000	1.

WILKES 1963 JULY						AVERAGE					
PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
950.	-15.8	.4396	.037	.4066	.056	.0330	0.00	0.000	.6335	.327	9.
900.	-16.7	.4062	.027	.3508	.049	.0554	2.64	1.584	.6079	.404	9.
850.	-18.0	.3851	.025	.3180	.047	.0671	1.38	1.011	.5312	.370	9.
800.	-19.3	.3700	.026	.2924	.049	.0776	1.23	1.221	.4193	.341	9.
750.	-21.0	.3586	.023	.2680	.042	.0906	1.53	1.343	.3876	.297	9.
700.	-23.5	.3514	.022	.2482	.039	.1032	1.49	.641	.3059	.255	9.
650.	-26.5	.3430	.021	.2299	.039	.1131	1.16	.646	.2016	.210	9.
600.	-30.1	.3354	.021	.2152	.042	.1202	.84	.583	.1504	.161	9.
550.	-34.1	.3260	.021	.1991	.040	.1269	.79	.497	.1120	.103	9.
500.	-37.9	.3140	.021	.1795	.036	.1345	.89	.974	.0685	.117	9.
450.	-42.8	.3029	.021	.1572	.031	.1457	1.32	1.903	.0259	.078	9.
400.	-48.7	.2898	.023	.1336	.030	.1562	1.23	.919	0.0000	0.000	9.
350.	-54.7	.2787	.022	.1150	.025	.1637	.88	.957	0.0000	0.000	9.
300.	-60.9	.2660	.020	.0983	.017	.1677	.47	.695	0.0000	0.000	9.
250.	-66.4	.2490	.022	.0857	.010	.1633	-.51	.601	0.0000	0.000	9.
200.	-68.2	.2333	.021	.0735	.007	.1598	-.41	.790	0.0000	0.000	9.
150.	-70.2	.2277	.024	.0640	.013	.1637	.45	1.679	0.0000	0.000	9.
100.	-73.5	.2195	.011	.0660	.011	.1535	-.45	1.600	0.0000	0.000	5.
80.	-75.0	.2254	.013	.0531	.012	.1723	2.79	1.249	0.0000	0.000	3.
60.	-77.8	.2365	.016	.0394	.002	.1971	7.08	.370	0.0000	0.000	2.
50.	-78.6	.2494	.010	.0299	.005	.2195	13.20	5.492	0.0000	0.000	2.
40.	-76.5	.2736	0.000	.0265	0.000	.2471	25.06	0.000	0.0000	0.000	1.

WILKES 1963 AUGUST AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
1000.	-17.7	.4580	.062	.4222	.084	.0358	0.00	0.000	.5817	.056	4.
950.	-17.3	.4232	.037	.3711	.054	.0521	.88	1.858	.4312	.176	12.
900.	-18.3	.3985	.035	.3260	.058	.0725	2.39	1.551	.3704	.263	12.
850.	-20.1	.3839	.031	.3027	.060	.0812	1.03	1.288	.3509	.271	12.
800.	-20.6	.3671	.031	.2793	.060	.0878	.78	1.095	.3630	.251	12.
750.	-22.1	.3585	.035	.2607	.062	.0978	1.18	.916	.3563	.274	12.
700.	-23.9	.3518	.036	.2412	.060	.1105	1.50	1.468	.3391	.322	12.
650.	-26.6	.3458	.035	.2247	.060	.1210	1.24	.918	.3275	.314	12.
600.	-30.2	.3398	.036	.2055	.058	.1344	1.57	.411	.2291	.255	12.
550.	-33.8	.3303	.034	.1853	.055	.1451	1.26	.978	.1406	.194	12.
500.	-38.2	.3237	.034	.1649	.053	.1588	1.00	.617	.0728	.147	11.
450.	-43.0	.3139	.031	.1458	.046	.1681	1.09	.576	.0485	.108	11.
400.	-48.6	.3019	.030	.1254	.034	.1765	.99	1.000	0.0000	0.000	11.
350.	-53.8	.2892	.027	.1056	.026	.1836	.83	.753	0.0000	0.000	11.
300.	-60.2	.2773	.024	.0903	.019	.1870	.40	.616	0.0000	0.000	11.
250.	-66.1	.2655	.023	.0777	.015	.1878	.09	.619	0.0000	0.000	11.
200.	-70.8	.2503	.025	.0686	.013	.1817	-.71	1.117	0.0000	0.000	11.
150.	-73.0	.2398	.021	.0568	.011	.1830	.15	1.178	0.0000	0.000	11.
100.	-75.9	.2413	.023	.0471	.011	.1942	.42	.877	0.0000	0.000	8.
80.	-77.7	.2374	.028	.0453	.013	.1921	.92	2.793	0.0000	0.000	7.
60.	-77.9	.2380	.030	.0427	.011	.1952	2.89	1.362	0.0000	0.000	5.
50.	-77.7	.2464	.026	.0365	.007	.2099	.80	1.148	0.0000	0.000	4.
40.	-75.0	.2617	.027	.0327	.005	.2289	-2.27	1.436	0.0000	0.000	2.
30.	-74.6	.2720	.045	.0280	.005	.2439	6.04	13.253	0.0000	0.000	2.
20.	-71.2	.2792	.050	.0199	.007	.2592	16.18	7.904	0.0000	0.000	2.

APPENDIX B

Three-monthly (June, July, August) Radiometersonde Data Averages
by Stations (vertical coordinate in pressure increments)

BYRD JUN-AUG AVERAGES 1963

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
800.	-30.3	.2765	.043	.2546	.042	.0218	0.00	0.000	.4031	.329	18.
750.	-26.3	.2709	.045	.2248	.046	.0460	1.75	1.797	.4726	.307	29.
700.	-27.5	.2789	.042	.2163	.044	.0626	1.95	.893	.4092	.272	29.
650.	-29.6	.2821	.040	.2044	.041	.0778	1.79	1.322	.3271	.223	29.
600.	-32.6	.2812	.036	.1914	.039	.0898	1.42	1.114	.2337	.171	29.
550.	-36.4	.2773	.034	.1752	.031	.1021	1.45	1.284	.1382	.139	29.
500.	-40.8	.2717	.032	.1576	.028	.1141	1.41	1.040	.0632	.090	29.
450.	-45.7	.2640	.029	.1412	.025	.1229	1.03	.849	.0060	.025	29.
400.	-51.1	.2548	.027	.1241	.023	.1308	.93	.747	0.0000	0.000	29.
350.	-56.7	.2438	.024	.1066	.019	.1372	.76	.671	0.0000	0.000	29.
300.	-62.9	.2332	.022	.0907	.013	.1425	.62	.590	0.0000	0.000	29.
250.	-68.3	.2210	.020	.0764	.008	.1446	.24	.967	0.0000	0.000	29.
200.	-71.5	.2096	.019	.0652	.009	.1444	-.02	.498	0.0000	0.000	29.
150.	-74.0	.2030	.020	.0565	.011	.1464	.24	.667	0.0000	0.000	29.
100.	-78.8	.1998	.020	.0496	.011	.1501	.44	1.514	0.0000	0.000	29.
80.	-81.1	.1993	.022	.0451	.011	.1543	1.37	2.660	0.0000	0.000	26.
60.	-83.5	.2038	.022	.0413	.012	.1625	1.34	4.251	0.0000	0.000	21.
50.	-84.6	.2050	.022	.0371	.012	.1679	3.16	3.963	0.0000	0.000	21.
40.	-85.2	.2103	.021	.0329	.012	.1774	6.71	8.478	0.0000	0.000	19.
30.	-85.8	.2133	.019	.0285	.008	.1848	8.88	11.148	0.0000	0.000	13.
20.	-84.8	.2247	.014	.0296	.007	.1951	3.62	3.161	0.0000	0.000	7.
10.	-80.2	.2281	.016	.0179	.009	.2102	-14.26	25.099	0.0000	0.000	4.

HALLETT JUN-AUG AVERAGES 1963

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
1000.	-20.5	.3597	.039	.3394	.054	.0203	0.00	0.000	.4354	.185	7.
950.	-22.4	.3340	.032	.2925	.047	.0415	.27	.736	.3508	.143	28.
900.	-23.3	.3327	.028	.2764	.047	.0563	1.73	1.228	.3305	.155	28.
850.	-24.4	.3306	.026	.2643	.045	.0662	1.17	.895	.3025	.192	28.
800.	-24.4	.3265	.026	.2516	.045	.0749	1.02	1.066	.3007	.234	28.
750.	-25.4	.3247	.022	.2429	.046	.0817	.80	.821	.2997	.216	28.
700.	-26.5	.3214	.021	.2327	.048	.0887	.83	.538	.3102	.241	28.
650.	-28.8	.3194	.020	.2200	.046	.0994	1.25	.766	.2549	.256	28.
600.	-31.9	.3161	.019	.2048	.043	.1114	1.41	.936	.1940	.217	28.
550.	-35.5	.3111	.018	.1890	.040	.1221	1.26	.603	.1195	.175	28.
500.	-39.8	.3040	.017	.1710	.037	.1329	1.28	.638	.0649	.118	28.
450.	-44.8	.2955	.016	.1517	.033	.1438	1.28	.706	.0181	.058	28.
400.	-50.4	.2853	.016	.1327	.026	.1526	1.03	.819	0.0000	0.000	28.
350.	-56.0	.2725	.020	.1112	.019	.1614	1.04	1.079	0.0000	0.000	28.
300.	-61.2	.2609	.019	.0956	.014	.1654	.47	.462	0.0000	0.000	28.
250.	-65.7	.2486	.021	.0835	.009	.1650	-.04	.629	0.0000	0.000	26.
200.	-67.2	.2376	.025	.0718	.008	.1658	.07	.601	0.0000	0.000	25.
150.	-69.1	.2351	.023	.0677	.008	.1674	.05	.722	0.0000	0.000	23.
100.	-73.6	.2332	.026	.0593	.009	.1739	.83	.893	0.0000	0.000	21.
80.	-76.1	.2323	.028	.0541	.009	.1782	1.21	2.737	0.0000	0.000	19.
60.	-78.4	.2273	.028	.0486	.011	.1787	1.78	4.710	0.0000	0.000	13.
50.	-79.8	.2282	.034	.0459	.011	.1824	2.14	3.120	0.0000	0.000	11.
40.	-79.6	.2381	.021	.0487	.017	.1894	-1.33	6.124	0.0000	0.000	7.
30.	-79.4	.2451	.023	.0466	.017	.1985	6.94	4.758	0.0000	0.000	6.
20.	-81.2	.2574	.011	.0362	.005	.2212	10.46	11.101	0.0000	0.000	3.
10.	-81.1	.2680	0.000	.0278	0.000	.2402	9.41	0.000	0.0000	0.000	1.

ADMUNSEN-SCOTT JUN-AUG AVERAGE 1963

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
600.	-36.9	.2217	.044	.1748	.043	.0469	1.51	1.714	.1571	.119	27.
550.	-39.5	.2253	.037	.1608	.036	.0645	2.08	1.467	.0974	.112	27.
500.	-43.2	.2236	.033	.1477	.031	.0759	1.34	.961	.0379	.077	27.
450.	-47.8	.2202	.031	.1311	.027	.0891	1.55	.715	.0083	.043	27.
400.	-53.1	.2145	.030	.1153	.027	.0992	1.19	.655	0.0000	0.000	27.
350.	-59.1	.2057	.027	.1000	.023	.1057	.76	.805	0.0000	0.000	27.
300.	-65.3	.1957	.024	.0863	.020	.1094	.43	.503	0.0000	0.000	27.
250.	-70.8	.1826	.021	.0721	.016	.1104	.15	.591	0.0000	0.000	27.
200.	-74.0	.1716	.019	.0615	.011	.1101	-.03	.773	0.0000	0.000	27.
150.	-76.5	.1668	.019	.0527	.012	.1141	.47	.851	0.0000	0.000	27.
100.	-81.2	.1630	.020	.0441	.011	.1189	.57	.860	0.0000	0.000	27.
80.	-83.2	.1633	.022	.0400	.012	.1233	1.98	3.590	0.0000	0.000	24.
60.	-85.5	.1648	.025	.0316	.016	.1331	2.54	4.649	0.0000	0.000	20.
50.	-86.6	.1674	.024	.0290	.019	.1384	1.57	4.625	0.0000	0.000	15.
40.	-86.7	.1700	.031	.0241	.023	.1459	4.85	5.381	0.0000	0.000	9.
30.	-86.7	.1736	.017	.0170	.019	.1566	-1.89	1.484	0.0000	0.000	2.
20.	-81.1	.1898	0.000	.0276	0.000	.1622	15.13	0.000	0.0000	0.000	1.

WILKES JUN-AUG AVERAGES 1963

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
1000.	-17.7	.4580	.062	.4222	.084	.0359	0.00	0.000	.5817	.056	4.
950.	-15.4	.4245	.036	.3697	.068	.0547	.38	1.266	.6291	.533	28.
900.	-17.0	.3995	.029	.3328	.054	.0666	1.99	3.937	.5214	.420	27.
850.	-18.4	.3832	.027	.3066	.055	.0766	1.17	1.202	.5084	.511	27.
800.	-19.6	.3684	.028	.2837	.055	.0847	.95	1.080	.4576	.453	27.
750.	-21.0	.3582	.029	.2636	.054	.0946	1.17	1.102	.4249	.387	27.
700.	-23.3	.3512	.029	.2471	.052	.1042	1.12	1.553	.3589	.360	27.
650.	-26.4	.3445	.028	.2309	.053	.1136	1.10	.932	.2844	.290	27.
600.	-29.9	.3365	.029	.2124	.050	.1240	1.23	.858	.2127	.240	27.
550.	-33.8	.3264	.028	.1936	.047	.1327	1.03	1.035	.1402	.168	27.
500.	-37.7	.3171	.027	.1730	.043	.1441	1.13	1.066	.0845	.135	26.
450.	-42.4	.3066	.026	.1528	.038	.1538	1.14	1.181	.0411	.092	26.
400.	-48.1	.2943	.027	.1316	.031	.1627	1.05	.881	0.0000	0.000	26.
350.	-53.8	.2824	.025	.1125	.025	.1699	.84	.772	0.0000	0.000	26.
300.	-60.2	.2695	.024	.0951	.017	.1745	.53	.674	0.0000	0.000	26.
250.	-65.5	.2549	.024	.0817	.013	.1732	-.14	.646	0.0000	0.000	26.
200.	-68.3	.2403	.026	.0711	.010	.1692	-.48	.938	0.0000	0.000	26.
150.	-70.2	.2325	.024	.0615	.012	.1710	.22	1.267	0.0000	0.000	26.
100.	-73.2	.2295	.023	.0570	.013	.1725	-.24	1.279	0.0000	0.000	18.
80.	-74.9	.2263	.025	.0518	.013	.1745	1.23	2.572	0.0000	0.000	14.
60.	-75.9	.2263	.027	.0479	.012	.1784	2.49	3.916	0.0000	0.000	11.
50.	-76.6	.2406	.022	.0376	.010	.2030	4.24	6.301	0.0000	0.000	8.
40.	-74.7	.2479	.029	.0391	.015	.2088	2.15	13.235	0.0000	0.000	5.
30.	-73.1	.2555	.043	.0404	.022	.2151	3.98	10.032	0.0000	0.000	3.
20.	-71.2	.2792	.050	.0199	.007	.2592	16.18	7.904	0.0000	0.000	2.

APPENDIX C

Dark Season Radiometersonde Data Averages by Stations

(vertical coordinates in pressure increments)

BYRD 1963 DARK SEASON AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
800.	-29.4	.2848	.042	.2673	.045	.0175	.02	.120	.4347	.383	28.
750.	-25.8	.2734	.042	.2337	.047	.0398	1.48	1.729	.5178	.352	50.
700.	-26.5	.2812	.040	.2248	.046	.0564	1.96	1.103	.4793	.329	50.
650.	-28.8	.2859	.037	.2143	.044	.0716	1.79	1.182	.3861	.282	50.
600.	-31.9	.2855	.034	.2012	.042	.0843	1.49	.941	.2870	.222	50.
550.	-35.6	.2812	.032	.1847	.036	.0965	1.43	1.150	.1901	.176	50.
500.	-40.0	.2748	.029	.1667	.034	.1081	1.37	1.005	.0944	.134	50.
450.	-44.9	.2666	.026	.1486	.030	.1179	1.15	.799	.0141	.064	50.
400.	-50.2	.2565	.024	.1300	.025	.1264	1.00	.670	.0052	.036	50.
350.	-55.7	.2454	.022	.1112	.020	.1342	.91	.840	0.0000	0.000	50.
300.	-60.8	.2337	.020	.0936	.014	.1401	.70	.746	0.0000	0.000	50.
250.	-63.2	.2207	.018	.0792	.010	.1415	.17	.875	0.0000	0.000	50.
200.	-64.4	.2127	.019	.0708	.013	.1419	.05	.529	0.0000	0.000	50.
150.	-66.6	.2098	.021	.0640	.015	.1458	.45	.709	0.0000	0.000	50.
100.	-70.8	.2077	.021	.0562	.014	.1515	.67	1.266	0.0000	0.000	50.
80.	-72.8	.2074	.022	.0515	.014	.1559	1.45	2.414	0.0000	0.000	45.
60.	-75.3	.2098	.021	.0465	.014	.1633	1.82	3.689	0.0000	0.000	37.
50.	-76.5	.2106	.020	.0427	.014	.1680	2.72	3.448	0.0000	0.000	37.
40.	-77.0	.2147	.019	.0390	.015	.1757	5.59	7.125	0.0000	0.000	33.
30.	-75.9	.2167	.016	.0348	.013	.1820	6.48	8.830	0.0000	0.000	27.
20.	-77.8	.2273	.014	.0349	.011	.1924	3.56	2.454	0.0000	0.000	12.
10.	-73.1	.2336	.017	.0167	.009	.2169	4.86	30.707	0.0000	0.000	8.

HALLETT 1963 DARK SEASON AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
1000.	-19.7	.3668	.040	.3488	.051	.0180	0.00	0.000	.3857	.232	12.
950.	-21.0	.3474	.037	.3050	.046	.0424	.25	.747	.4337	.240	66.
900.	-21.9	.3443	.033	.2855	.044	.0588	1.86	1.125	.4122	.221	67.
850.	-23.0	.3406	.030	.2718	.044	.0688	1.17	1.038	.3732	.232	67.
800.	-23.5	.3360	.029	.2582	.043	.0778	1.06	1.019	.3537	.252	67.
750.	-24.3	.3323	.027	.2455	.042	.0868	1.06	1.146	.3525	.284	67.
700.	-25.8	.3293	.027	.2339	.042	.0954	1.01	.782	.3219	.288	67.
650.	-28.3	.3264	.026	.2213	.041	.1051	1.15	.684	.2703	.281	67.
600.	-31.4	.3223	.026	.2070	.040	.1152	1.19	.928	.1994	.233	67.
550.	-35.2	.3163	.025	.1913	.039	.1250	1.15	.603	.1237	.171	67.
500.	-39.6	.3085	.024	.1732	.036	.1353	1.21	.711	.0610	.119	67.
450.	-44.4	.2997	.023	.1533	.032	.1463	1.30	.819	.0277	.077	67.
400.	-49.9	.2881	.022	.1342	.026	.1540	.90	.714	.0034	.027	66.
350.	-55.5	.2758	.023	.1147	.020	.1611	.84	.860	0.0000	0.000	66.
300.	-60.4	.2627	.022	.0972	.012	.1655	.43	.497	0.0000	0.000	63.
250.	-62.0	.2503	.023	.0841	.009	.1663	.12	.580	0.0000	0.000	59.
200.	-62.9	.2441	.026	.0758	.009	.1684	.17	.662	0.0000	0.000	57.
150.	-63.7	.2424	.026	.0712	.009	.1712	.38	.723	0.0000	0.000	49.
100.	-66.5	.2432	.028	.0636	.010	.1796	.90	.790	0.0000	0.000	44.
80.	-67.8	.2441	.030	.0606	.012	.1835	.83	3.223	0.0000	0.000	40.
60.	-68.4	.2459	.030	.0552	.011	.1907	2.47	4.127	0.0000	0.000	31.
50.	-69.2	.2482	.034	.0530	.011	.1952	2.41	3.214	0.0000	0.000	26.
40.	-68.1	.2550	.027	.0534	.012	.2017	1.64	7.601	0.0000	0.000	21.
30.	-69.0	.2594	.027	.0485	.012	.2109	5.34	5.174	0.0000	0.000	15.
20.	-68.1	.2741	.021	.0443	.010	.2298	12.01	11.791	0.0000	0.000	9.
10.	-67.1	.2938	.027	.0285	.001	.2653	6.09	14.545	0.0000	0.000	4.

POLE 1963 DARK SEASON AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
650.	-41.2	.2346	.060	.2069	.060	.0277	0.00	0.000	.0805	.106	54.
600.	-37.5	.2194	.041	.1759	.041	.0435	1.86	1.847	.1334	.103	54.
550.	-39.9	.2241	.033	.1628	.033	.0613	2.10	1.269	.0815	.097	54.
500.	-43.5	.2245	.029	.1499	.028	.0745	1.55	.897	.0274	.062	54.
450.	-47.9	.2217	.027	.1344	.024	.0874	1.51	.685	.0042	.031	54.
400.	-53.0	.2164	.026	.1187	.023	.0977	1.21	.727	0.0000	0.000	54.
350.	-58.7	.2078	.024	.1032	.020	.1046	.82	.692	0.0000	0.000	54.
300.	-63.6	.1974	.021	.0883	.018	.1091	.53	.549	0.0000	0.000	54.
250.	-66.4	.1860	.020	.0749	.017	.1111	.25	.573	0.0000	0.000	54.
200.	-67.4	.1792	.020	.0659	.017	.1133	.26	.704	0.0000	0.000	54.
150.	-69.5	.1774	.023	.0596	.018	.1178	.53	.746	0.0000	0.000	54.
100.	-73.6	.1759	.025	.0513	.019	.1246	.80	.796	0.0000	0.000	54.
80.	-75.0	.1767	.028	.0480	.020	.1287	1.60	3.247	0.0000	0.000	50.
60.	-76.7	.1777	.028	.0425	.022	.1352	1.95	3.988	0.0000	0.000	44.
50.	-76.2	.1821	.030	.0408	.024	.1412	2.28	3.777	0.0000	0.000	37.
40.	-74.9	.1868	.034	.0401	.027	.1467	3.02	5.567	0.0000	0.000	30.
30.	-71.6	.1929	.037	.0412	.031	.1517	1.44	4.489	0.0000	0.000	18.
20.	-68.3	.2096	.055	.0496	.039	.1601	1.02	17.568	0.0000	0.000	11.
10.	-48.5	.3558	0.000	.1308	0.000	.2250	-14.71	0.000	0.0000	0.000	-1.

WILKES 1963 DARK SEASON AVERAGE

PRES	TEMP	R-UP	S-RU	R-DN	S-RD	R-NET	COOL	S-CL	Q	S-Q	N
1000.	-15.5	.4752	.050	.4518	.066	.0234	0.00	0.000	.7781	.341	8.
950.	-15.1	.4307	.041	.3799	.066	.0508	.32	1.170	.6208	.479	48.
900.	-16.2	.4047	.035	.3400	.056	.0647	1.98	3.201	.5447	.398	47.
850.	-17.4	.3881	.033	.3142	.056	.0739	1.08	1.090	.5013	.481	47.
800.	-18.7	.3743	.032	.2927	.055	.0816	.91	1.176	.4844	.434	47.
750.	-20.1	.3646	.033	.2715	.055	.0931	1.34	1.620	.4657	.430	47.
700.	-22.4	.3573	.032	.2551	.055	.1023	1.08	1.422	.4112	.428	47.
650.	-25.4	.3492	.030	.2390	.057	.1102	.94	1.204	.3545	.388	47.
600.	-28.7	.3400	.030	.2219	.057	.1181	.93	1.419	.2814	.352	47.
550.	-32.5	.3304	.030	.2041	.055	.1263	.97	.918	.1956	.268	47.
500.	-36.6	.3205	.029	.1822	.049	.1382	1.30	1.227	.1359	.198	46.
450.	-41.2	.3096	.028	.1596	.042	.1500	1.38	1.277	.0766	.138	46.
400.	-46.7	.2971	.027	.1379	.034	.1592	1.09	.926	.0222	.067	46.
350.	-52.4	.2849	.025	.1181	.027	.1668	.89	.854	0.0000	0.000	46.
300.	-57.6	.2716	.023	.0999	.022	.1717	.57	.711	0.0000	0.000	46.
250.	-60.8	.2587	.022	.0881	.030	.1706	-.13	1.603	0.0000	0.000	46.
200.	-61.9	.2479	.026	.0791	.030	.1688	-.20	.845	0.0000	0.000	46.
150.	-63.1	.2430	.028	.0713	.031	.1717	.34	1.039	0.0000	0.000	46.
100.	-65.5	.2423	.027	.0690	.037	.1733	.03	1.177	0.0000	0.000	33.
80.	-65.7	.2439	.032	.0644	.033	.1795	1.95	3.523	0.0000	0.000	29.
60.	-65.6	.2511	.040	.0626	.032	.1885	2.83	4.586	0.0000	0.000	25.
50.	-65.0	.2640	.044	.0592	.032	.2048	5.08	8.058	0.0000	0.000	22.
40.	-63.7	.2679	.047	.0581	.027	.2098	3.02	7.864	0.0000	0.000	16.
30.	-62.8	.2632	.042	.0538	.025	.2093	1.63	8.691	0.0000	0.000	11.
20.	-61.9	.2769	.053	.0505	.031	.2264	15.4616	.067	0.0000	0.000	8.
10.	-51.2	.3602	.003	.0917	.029	.2686	38.9539	.085	0.0000	0.000	2.

APPENDIX D

Monthly Radiometersonde Data Averages by Stations

(vertical coordinate in 2-km increments)

STATION BYRD, MARCH 1963
ELEVATION=1.5330 KM

HEIGHT ¹³	TEMP	RADIATION ¹⁴ UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT ¹⁵	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-29.27	.2641	.030	.2530	.047	.0111	0	0	4	.40
2	-27.52	.2631	.027	.2265	.028	.0367	-3.05	4.02	4	.36
4	-33.87	.2715	.016	.1846	.016	.0869	-1.61	.87	4	.23
6	-46.09	.2532	.011	.1464	.010	.1068	-.82	.16	4	0
8	-53.62	.2275	.014	.1065	.013	.1210	-.76	.60	4	0
10	-46.51	.2173	.006	.0914	.019	.1258	-.36	.61	4	0
12	-47.01	.2194	.007	.0914	.020	.1280	-.22	.30	4	0
14	-48.64	.2219	.009	.0828	.017	.1391	-1.48	.28	4	0
16	-50.94	.2205	.007	.0747	.015	.1458	-1.20	.47	4	0
18	-52.76	.2202	.007	.0682	.016	.1520	-1.50	.85	4	0
20	-54.93	.2199	.004	.0640	.010	.1559	-1.27	1.51	4	0
22	-55.65	.2178	.008	.0555	.014	.1623	-2.85	2.27	4	0
24	-56.57	.2168	.009	.0504	.010	.1664	-2.45	5.58	4	0
26	-52.85	.2217	.000	.0516	.000	.1702	-7.50	.00	1	0
28	-53.48	.2188	.000	.0475	.000	.1714	-1.37	.00	1	0
30	-51.33	.2197	.000	.0145	.000	.2052	-50.45	.04	1	0

STATION BYRD, APRIL 1963
ELEVATION=1.5330 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-27.05	.2963	.047	.2930	.061	.0033	0	0	8	.45
2	-22.80	.2939	.047	.2616	.062	.0324	-3.44	1.74	8	.78
4	-32.34	.3069	.042	.2180	.047	.0889	-1.93	.63	7	.49
6	-44.56	.2777	.033	.1534	.036	.1243	-1.45	.74	7	.43
8	-54.24	.2505	.025	.1081	.023	.1424	-.95	.61	7	0
10	-52.94	.2322	.017	.0847	.012	.1476	-.36	.48	7	0
12	-52.66	.2310	.017	.0811	.011	.1499	-.25	.59	7	0
14	-54.47	.2308	.017	.0760	.008	.1548	-.62	1.16	7	0
16	-57.22	.2329	.019	.0688	.008	.1641	-1.40	.58	6	0
18	-60.60	.2286	.017	.0622	.007	.1664	-1.67	1.14	5	0
20	-63.70	.2251	.019	.0528	.008	.1722	-1.99	1.49	4	0
22	-65.66	.2276	.019	.0472	.013	.1804	-3.83	3.79	4	0
24	-65.44	.2301	.018	.0446	.005	.1854	-2.28	6.48	3	0
26	-65.66	.2455	.013	.0428	.006	.2026	-9.01	.37	2	0
28	-65.32	.2512	.019	.0314	.003	.2199	-19.88	4.96	2	0
30	-62.63	.2369	.000	.0271	.000	.2097	-9.63	.01	1	0
32	-62.43	.2385	.000	.0260	.000	.2125	-6.12	.01	1	0
34	-62.99	.2393	.000	.0277	.000	.2117	2.37	.00	1	0

STATION BYRD, MAY 1963
ELEVATION=1.5330 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-31.66	.2786	.032	.2819	.034	-.0034	0	0	11	.26
2	-24.56	.2737	.023	.2402	.038	.0335	-4.30	3.24	11	.55
4	-32.57	.2890	.020	.2070	.044	.0820	-1.57	.51	11	.33
6	-47.12	.2651	.017	.1475	.034	.1176	-1.45	.77	11	0
8	-60.68	.2366	.016	.0960	.016	.1405	-1.19	1.00	11	0
10	-62.97	.2110	.016	.0715	.005	.1395	.07	.64	11	0
12	-63.57	.2084	.015	.0656	.010	.1429	-.32	.86	11	0
14	-66.46	.2075	.013	.0578	.008	.1497	-.90	1.16	11	0
16	-70.54	.2083	.013	.0508	.008	.1575	-1.38	.66	10	0
18	-74.63	.2116	.016	.0404	.007	.1712	-3.09	1.55	9	0
20	-76.52	.2137	.013	.0361	.009	.1776	-2.26	2.83	8	0
22	-77.99	.2188	.013	.0265	.013	.1923	-6.08	2.71	7	0
24	-79.48	.2282	.011	.0319	.015	.1963	-.92	4.58	3	0
26	-79.09	.2339	.014	.0148	.005	.2191	-16.48	4.50	2	0
28	-78.02	.2282	.002	.0055	.001	.2226	-4.81	24.74	2	0
30	-77.37	.2152	.001	.0028	.008	.2124	20.33	19.29	2	0
32	-76.61	.2105	.000	-.0065	.000	.2170	5.16	.00	1	0
34	-77.41	.2091	.000	-.0033	.000	.2124	18.00	.02	1	0
36	-78.50	.2084	.000	.0012	.000	.2072	29.35	.05	1	0

¹³Height in geopotential kilometers, G/KM.

¹⁴Upward irradiance in langleys per minute.

¹⁵Number of observations at a particular height.

STATION BYRD, JUNE 1963
ELEVATION=1.5330 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-26.44	.3004	.032	.2890	.030	.0114	0	0	8	.39
2	-20.02	.3062	.029	.2398	.027	.0664	-6.52	2.40	8	.77
4	-30.66	.3098	.025	.1965	.024	.1133	-1.52	.20	8	.28
6	-45.55	.2859	.022	.1540	.029	.1320	-.76	.55	8	.12
8	-60.25	.2538	.019	.1084	.022	.1454	-.69	.66	8	0
10	-68.44	.2303	.016	.0734	.009	.1568	-.75	.85	8	0
12	-70.74	.2204	.016	.0589	.009	.1615	-.42	.76	8	0
14	-73.57	.2195	.015	.0522	.008	.1673	-.76	1.59	8	0
16	-77.51	.2188	.021	.0505	.010	.1683	-.11	1.85	7	0
18	-80.40	.2181	.026	.0457	.015	.1724	-.33	2.26	6	0
20	-82.93	.2242	.026	.0376	.012	.1867	-4.80	4.50	6	0
22	-84.52	.2249	.011	.0309	.008	.1940	-7.02	8.66	5	0
24	-83.97	.2310	.008	.0316	.008	.1994	-3.02	3.48	4	0
26	-81.99	.2303	.013	.0230	.005	.2073	-1.23	8.39	3	0
28	-81.13	.2285	.021	.0229	.006	.2056	2.25	9.26	3	0

STATION BYRD, JULY 1963
ELEVATION=1.5330 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-38.69	.2430	.033	.2389	.043	.0041	0	0	10	.17
2	-31.95	.2424	.027	.1961	.033	.0463	-4.81	2.75	10	.26
4	-38.98	.2546	.027	.1627	.029	.0919	-1.45	.72	10	.19
6	-51.34	.2397	.022	.1183	.019	.1214	-1.20	.43	10	0
8	-62.57	.2209	.016	.0887	.009	.1322	-.57	.40	10	0
10	-70.02	.2033	.010	.0716	.009	.1318	.03	.50	10	0
12	-73.24	.1930	.011	.0635	.010	.1294	.21	1.11	10	0
14	-77.67	.1909	.015	.0561	.010	.1348	-.70	1.65	10	0
16	-81.36	.1935	.016	.0458	.011	.1477	-2.08	1.65	9	0
18	-83.96	.1956	.018	.0413	.012	.1543	-2.41	1.67	7	0
20	-84.80	.2033	.017	.0351	.017	.1683	-2.82	1.90	5	0
22	-85.31	.1912	.023	.0216	.004	.1696	-.98	14.96	2	0

STATION BYRD, AUGUST 1963
ELEVATION=1.5330 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-32.84	.2607	.055	.2628	.057	-.0021	0	0	9	.35
2	-25.63	.2609	.052	.2369	.063	.0240	-2.95	2.71	9	.46
4	-34.90	.2736	.032	.1886	.048	.0850	-1.91	.86	9	.30
6	-48.65	.2543	.026	.1279	.025	.1264	-1.65	1.15	9	0
8	-61.37	.2318	.024	.0895	.012	.1422	-.80	.63	9	0
10	-72.12	.2113	.025	.0670	.005	.1443	-.14	.22	9	0
12	-78.36	.1989	.024	.0507	.006	.1482	-.34	.47	9	0
14	-82.81	.1939	.021	.0413	.007	.1525	-.55	1.06	9	0
16	-86.10	.1917	.022	.0340	.007	.1577	-.91	.89	8	0
18	-88.82	.2008	.022	.0315	.009	.1693	-.67	2.66	6	0
20	-89.22	.2052	.029	.0302	.003	.1749	-2.94	3.32	4	0
22	-88.44	.2056	.011	.0247	.007	.1809	-10.87	10.24	3	0
24	-86.93	.2084	.015	.0244	.005	.1839	-8.64	6.70	2	0
26	-82.38	.1969	.000	.0082	.000	.1887	-19.90	.05	1	0

STATION HALLETT, MARCH 1963
ELEVATION= .0005 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-12.20	.4551	.025	.4728	.028	-.0176	0	0	4	1.13
2	-17.93	.3768	.026	.3045	.025	.0722	-2.30	1.14	4	.71
4	-26.57	.3511	.019	.2397	.027	.1114	-1.26	.86	4	.41
6	-38.04	.3267	.021	.1847	.027	.1420	-1.25	.28	4	.21
8	-52.69	.2864	.026	.1151	.010	.1712	-1.50	.70	3	0
10	-48.01	.2669	.019	.0884	.007	.1785	-.50	.28	3	0
12	-46.59	.2737	.017	.0837	.003	.1900	-1.10	.32	3	0
14	-48.69	.2763	.016	.0787	.005	.1976	-.99	.95	3	0
16	-50.69	.2670	.020	.0670	.022	.2000	-.44	2.86	3	0
18	-52.19	.2691	.010	.0706	.009	.1985	.33	.73	3	0
20	-54.00	.2747	.017	.0599	.004	.2148	-5.06	5.53	3	0
22	-54.83	.2704	.019	.0543	.005	.2161	-.56	1.41	3	0
24	-54.78	.2748	.016	.0439	.013	.2309	-8.70	6.21	3	0
26	-56.01	.2860	.002	.0470	.005	.2390	-4.47	1.14	2	0
28	-55.53	.2905	.003	.0391	.006	.2514	-13.24	5.92	2	0
30	-57.70	.2904	.000	.0283	.000	.2621	-6.18	.01	1	0

STATION HALLETT, APRIL 1963
ELEVATION= .0005 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-18.48	.3905	.040	.3831	.056	.0074	0	0	9	.69
2	-21.37	.3509	.027	.2576	.036	.0933	-2.17	.53	9	.54
4	-32.22	.3349	.025	.2038	.028	.1312	-1.23	.66	9	.29
6	-45.33	.3096	.021	.1492	.022	.1604	-1.19	.39	9	0
8	-56.16	.2801	.023	.1107	.010	.1694	-.47	.32	9	0
10	-50.21	.2645	.025	.0878	.005	.1767	-.51	.40	9	0
12	-50.72	.2676	.029	.0840	.006	.1835	-.66	.48	8	0
14	-52.56	.2672	.025	.0802	.008	.1870	-.46	.68	8	0
16	-53.22	.2680	.028	.0705	.008	.1975	-1.87	1.58	8	0
18	-55.48	.2700	.024	.0652	.008	.2048	-1.75	1.03	8	0
20	-56.43	.2814	.017	.0616	.006	.2197	-2.38	2.45	6	0
22	-57.36	.2869	.022	.0533	.009	.2336	-5.14	8.92	5	0
24	-58.00	.2893	.027	.0509	.009	.2385	-2.48	8.34	3	0
26	-59.05	.2874	.031	.0522	.011	.2353	2.61	5.07	3	0
28	-59.54	.3105	.020	.0400	.008	.2705	-13.52	10.54	2	0
30	-59.48	.3319	.000	.0278	.000	.3042	-21.13	.04	1	0

STATION HALLETT, MAY 1963
ELEVATION= .0005 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-21.91	.3621	.022	.3356	.035	.0266	0	0	11	.50
2	-23.49	.3333	.024	.2494	.050	.0839	-1.43	.82	11	.43
4	-32.91	.3279	.031	.2095	.059	.1184	-1.11	.59	11	.33
6	-47.34	.3032	.028	.1559	.048	.1473	-1.19	1.00	11	.20
8	-60.93	.2658	.023	.1049	.030	.1608	-.74	.41	10	0
10	-59.64	.2383	.020	.0735	.008	.1648	.00	.52	8	0
12	-59.66	.2412	.019	.0666	.007	.1746	-.94	.34	8	0
14	-61.69	.2433	.020	.0610	.005	.1824	-1.03	.85	8	0
16	-64.18	.2428	.025	.0573	.005	.1855	-1.23	.92	6	0
18	-67.04	.2565	.015	.0493	.003	.2072	-1.96	.90	3	0
20	-67.14	.2536	.020	.0488	.001	.2048	-.47	.42	2	0
22	-71.86	.2712	.000	.0453	.000	.2259	-3.66	.00	1	0

STATION HALLETT, JUNE 1963
ELEVATION= .0005 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-23.59	.3413	.029	.3310	.043	.0103	0	0	10	.37
2	-27.39	.3190	.029	.2299	.038	.0890	-1.97	.84	10	.32
4	-35.79	.3078	.022	.1783	.026	.1296	-1.30	.70	10	.20
6	-48.17	.2899	.015	.1293	.014	.1606	-1.27	.36	10	0
8	-58.34	.2698	.012	.0979	.006	.1719	-.60	.22	10	0
10	-61.56	.2501	.018	.0787	.005	.1714	.01	.46	9	0
12	-63.60	.2466	.019	.0706	.007	.1760	-.44	.33	9	0
14	-67.22	.2453	.017	.0639	.007	.1814	-.69	.51	9	0
16	-70.80	.2445	.015	.0561	.008	.1884	-.97	.81	6	0
18	-74.11	.2399	.013	.0475	.013	.1925	-1.22	5.59	4	0
20	-72.18	.2495	.013	.0483	.013	.2013	-.30	1.49	2	0
22	-74.29	.2540	.011	.0401	.014	.2140	-5.97	.85	2	0
24	-71.12	.2459	.000	.0418	.000	.2041	-4.85	.00	1	0

STATION HALLETT, JULY 1963
ELEVATION= .0005 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-22.71	.3499	.029	.3358	.027	.0141	0	0	10	.37
2	-24.22	.3263	.019	.2393	.039	.0870	-1.82	.84	10	.35
4	-34.10	.3133	.015	.1932	.040	.1201	-.85	.35	9	.23
6	-48.01	.2914	.018	.1402	.028	.1511	-1.27	.81	9	0
8	-61.35	.2643	.026	.0930	.009	.1713	-1.04	.70	9	0
10	-69.06	.2502	.020	.0774	.009	.1728	.06	.52	8	0
12	-70.16	.2403	.021	.0713	.010	.1690	.02	.70	7	0
14	-74.12	.2435	.020	.0646	.011	.1789	-1.29	1.27	7	0
16	-77.43	.2461	.018	.0585	.012	.1876	-1.55	1.75	7	0
18	-79.63	.2431	.018	.0539	.012	.1893	-2.94	1.95	4	0
20	-82.03	.2515	.020	.0643	.024	.1872	-.25	3.25	2	0
22	-82.69	.2551	.025	.0595	.018	.1955	-4.29	5.52	2	0
24	-81.94	.2591	.016	.0390	.002	.2201	-17.94	8.98	2	0
26	-76.35	.2628	0	.0343	0	.2285	4.98	0	1	0

STATION HALLETT, AUGUST 1963
ELEVATION= .0005 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-20.63	.3624	.057	.3516	.063	.0107	0	0	9	.42
2	-24.02	.3315	.020	.2710	.057	.0605	-1.22	.93	9	.41
4	-31.75	.3191	.019	.2181	.054	.1010	-1.29	.44	9	.39
6	-46.12	.2926	.021	.1616	.043	.1310	-1.21	.50	9	.20
8	-59.96	.2586	.020	.1082	.030	.1504	-.98	1.12	9	0
10	-69.71	.2295	.022	.0765	.012	.1530	-.17	.40	9	0
12	-72.55	.2173	.018	.0649	.005	.1524	.57	.97	7	0
14	-76.62	.2092	.018	.0566	.005	.1526	-.40	.56	6	0
16	-79.35	.2040	.025	.0483	.003	.1557	-.58	2.15	6	0
18	-81.30	.2052	.032	.0408	.003	.1643	-2.76	1.20	5	0
20	-82.16	.2244	.019	.0385	.003	.1858	-1.12	3.15	3	0
22	-80.08	.2254	.025	.0354	.001	.1901	-7.11	5.37	2	0
24	-79.61	.2557	0	.0309	0	.2248	-11.26	.00	1	0
26	-80.86	.2636	.000	.0312	0	.2324	-7.45	0	1	0
28	-81.14	.2682	0	.0279	0	.2403	-10.98	0	1	0
30	-81.24	.2762	0	.0249	0	.2513	-21.78	0	1	0
32	-79.47	.2835	0	.0179	0	.2655	-40.26	0	1	0
34	-78.26	.2935	.000	.0112	.000	.2823	-68.73	0	1	0
36	-77.93	.2890	0	.0093	0	.2798	14.57	0	1	0
38	-77.80	.2819	0	.0089	0	.2731	55.30	0	1	0
40	-77.80	.2735	0	.0093	.000	.2642	103.88	0	1	0

STATION HALLETT, SEPTEMBER 1963
ELEVATION= .0005 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-21.51	.3532	.032	.3527	.020	.0004	0	0	7	.39
2	-25.25	.3238	.021	.2258	.013	.0980	-2.41	.52	7	.24
4	-34.43	.3130	.023	.1821	.016	.1308	-1.05	.48	7	.16
6	-47.10	.2882	.032	.1308	.013	.1574	-1.07	.23	7	0
8	-59.99	.2692	.031	.0983	.012	.1709	-.70	.31	7	0
10	-69.24	.2521	.032	.0797	.009	.1723	-.09	.45	7	0
12	-71.68	.2278	.025	.0736	.007	.1542	-.12	.41	4	0
14	-73.99	.2346	.006	.0602	.001	.1744	-.87	.20	2	0
16	-80.09	.2369	0	.0525	.000	.1844	-.82	0	1	0
18	-83.37	.2416	0	.0454	0	.1962	-2.97	.00	1	0
20	-81.69	.2492	0	.0404	.000	.2087	-4.49	.00	1	0
22	-83.08	.2505	0	.0456	.000	.2049	1.95	.00	1	0
24	-79.14	.2685	.000	.0365	.000	.2321	-20.16	.00	1	0
26	-72.85	.2819	.000	.0287	.000	.2533	-22.90	.00	1	0

STATION HALLETT, OCTOBER 1963
ELEVATION= .0005 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-19.90	.3720	.039	.3525	.039	.0196	0	0	8	.44
2	-27.49	.3231	.027	.2300	.020	.0931	-1.84	.37	8	.26
4	-37.63	.2972	.024	.1766	.025	.1207	-.88	.28	8	.11
6	-50.24	.2710	.020	.1238	.009	.1473	-1.08	.50	8	0
8	-61.59	.2432	.011	.0975	.009	.1457	-.14	.20	7	0
10	-66.63	.2298	.008	.0847	.009	.1451	.04	.52	6	0
12	-70.41	.2230	.007	.0748	.010	.1482	.06	.37	3	0
14	-70.60	.2225	.008	.0692	.009	.1533	-.67	.13	3	0
16	-70.01	.2241	.010	.0667	.008	.1575	-.75	.49	3	0
18	-69.50	.2272	.013	.0650	.010	.1622	-1.21	1.46	3	0
20	-68.06	.2294	.012	.0649	.008	.1645	-.81	1.62	3	0
22	-64.70	.2300	0	.0627	.000	.1673	-4.47	.00	1	0

STATION AMUNDSEN-SCOTT, MARCH 1963
ELEVATION=2.8000 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-51.67	.1308	.030	.1208	.023	.0099	0	0	3	0
2	-39.11	.1892	.004	.1512	.019	.0381	.29	.07	3	.12
4	-48.30	.2138	.012	.1343	.013	.0795	-1.68	.73	3	0
6	-55.10	.2059	.004	.1109	.007	.0950	-.81	.05	3	0
8	-48.51	.2013	.003	.0962	.003	.1052	-.73	.19	3	0
10	-48.86	.2096	.004	.0941	.004	.1155	-1.02	.09	3	0
12	-50.34	.2156	.007	.0952	.009	.1204	-.65	.44	3	0
14	-51.91	.2182	.010	.0890	.009	.1291	-1.56	.96	3	0
16	-53.84	.2194	.012	.0801	.015	.1393	-2.47	1.09	3	0
20	-55.97	.2290	.010	.0782	.013	.1509	-3.79	1.37	3	0
22	-57.73	.2351	.006	.0816	.009	.1535	-1.18	3.19	3	0
24	-57.34	.2513	.011	.0802	.016	.1711	-8.72	1.58	2	0
26	-56.34	.2646	.013	.0850	.022	.1795	-7.12	3.56	2	0
28	-55.90	.2801	.017	.0897	.030	.1905	-12.63	3.60	2	0

STATION AMUNDSEN-SCOTT, APRIL 1963
ELEVATION=2.8000 KM

HEIGHT	TEMP	RADIATION		RADIATION		RADIATION	WARMING		COUNT	MIXING
G/KM	DEG C	UP		DOWN		NET	DEG C/DAY			RATIO
		LY/MIN		LY/MIN		LY/MIN				
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-47.82	.2138	.106	.1957	.117	.0181	0	0	9	0
2										
4	-40.86	.2037	.030	.1572	.035	.0465	.30	.25	9	.13
6	-50.93	.2063	.018	.1289	.022	.0774	-1.24	.47	9	0
8	-59.70	.1890	.015	.0950	.017	.0940	-.86	.63	9	0
10	-55.39	.1776	.010	.0782	.021	.0994	-.38	.22	9	0
12	-55.76	.1814	.009	.0738	.022	.1076	-.81	.36	9	0
14	-58.03	.1843	.009	.0685	.022	.1159	-1.10	.50	9	0
16	-60.85	.1830	.011	.0617	.024	.1213	-.98	.73	9	0
18	-63.65	.1823	.009	.0551	.023	.1272	-1.48	1.01	9	0
20	-65.74	.1813	.010	.0485	.023	.1328	-1.88	1.43	9	0
22	-66.03	.1797	.010	.0466	.028	.1331	-2.75	2.65	7	0
24	-67.03	.1790	.010	.0409	.029	.1382	-3.20	4.18	7	0
26	-66.27	.1725	.007	.0557	.031	.1169	-2.94	8.59	3	0
28	-65.01	.1739	.006	.0276	.002	.1463	-11.94	.23	2	0

STATION AMUNDSEN-SCOTT, MAY 1963
ELEVATION=2.8000 KM

HEIGHT	TEMP	RADIATION		RADIATION		RADIATION	WARMING		COUNT	MIXING
G/KM	DEG C	UP		DOWN		NET	DEG C/DAY			RATIO
		LY/MIN		LY/MIN		LY/MIN				
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-49.73	.3593	.130	.3017	.152	.0575	0	0	9	0
2										
4	-39.05	.2379	.029	.1898	.034	.0480	-.10	1.14	9	.16
6	-51.15	.2303	.020	.1346	.021	.0957	-1.91	.57	9	0
8	-63.49	.2054	.017	.0899	.013	.1156	-1.02	.40	9	0
10	-65.75	.1846	.014	.0621	.007	.1225	-.46	.61	9	0
12	-66.23	.1827	.013	.0549	.008	.1278	-.51	.42	9	0
14	-69.57	.1833	.013	.0502	.006	.1330	-.69	.52	9	0
16	-73.36	.1827	.014	.0432	.007	.1395	-1.16	1.18	9	0
18	-76.31	.1793	.012	.0363	.006	.1430	-1.21	1.43	7	0
20	-78.85	.1769	.014	.0286	.005	.1483	-1.58	2.09	6	0
22	-78.91	.1779	.013	.0226	.003	.1552	-1.87	3.11	5	0
24	-75.83	.1811	.024	.0145	.002	.1667	-9.96	2.30	2	0
26	-75.95	.1935	.000	.0143	0	.1792	2.99	0	1	0

STATION AMUNDSEN-SCOTT, JUNE 1963
ELEVATION=2.8000 KM

HEIGHT	TEMP	RADIATION		RADIATION		RADIATION	WARMING		COUNT	MIXING
G/KM	DEG C	UP		DOWN		NET	DEG C/DAY			RATIO
		LY/MIN		LY/MIN		LY/MIN				
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-48.18	.3096	.088	.2768	.089	.0327	0	0	10	0
2										
4	-36.08	.2362	.030	.1719	.039	.0643	.32	.78	10	.20
6	-48.49	.2310	.026	.1269	.033	.1040	-1.60	.56	10	.19
8	-62.59	.2111	.021	.0923	.031	.1188	-.76	.32	10	0
10	-71.55	.1869	.015	.0657	.015	.1212	-.16	.30	10	0
12	-72.88	.1758	.021	.0516	.007	.1242	-.27	.50	10	0
14	-75.99	.1752	.021	.0429	.007	.1323	-1.03	1.00	10	0
16	-80.08	.1747	.021	.0369	.006	.1378	-1.00	1.59	10	0
18	-84.58	.1754	.020	.0297	.009	.1457	-1.96	1.67	10	0
20	-85.66	.1836	.018	.0190	.009	.1646	-4.82	2.91	6	0
22	-85.30	.1985	.016	.0171	.018	.1814	-3.62	5.38	2	0
24	-83.42	.1987	.013	.0079	.026	.1908	-6.58	3.12	2	0

STATION AMUNDSEN-SCOTT, JULY 1963
ELEVATION=2.8000 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-56.48	.3725	.108	.3479	.092	.0246	0	0	13	0
2										
4	-40.94	.2165	.045	.1565	.033	.0600	.37	.52	13	.20
6	-51.53	.2078	.036	.1160	.021	.0919	-1.11	.55	12	0
8	-63.86	.1898	.032	.0883	.015	.1015	-.50	.53	12	0
10	-72.47	.1723	.030	.0697	.013	.1027	-.13	.29	11	0
12	-75.94	.1635	.024	.0584	.015	.1052	-.24	.76	11	0
14	-80.23	.1609	.024	.0507	.014	.1102	-.65	1.07	11	0
16	-84.23	.1611	.029	.0446	.019	.1164	-.86	1.63	9	0
18	-87.33	.1605	.037	.0285	.032	.1319	-3.68	3.96	6	0
20	-87.79	.1565	.053	.0328	.039	.1237	-.15	4.36	3	0

STATION AMUNDSEN-SCOTT, AUGUST 1963
ELEVATION=2.8000 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-49.94	.2715	.125	.2600	.105	.0115	0	0	10	0
2										
4	-37.54	.2176	.042	.1709	.048	.0466	.36	.24	10	.17
6	-50.81	.2175	.026	.1245	.030	.0931	-1.83	.72	10	0
8	-64.92	.1972	.019	.0861	.015	.1112	-.91	.58	10	0
10	-74.86	.1755	.012	.0631	.008	.1124	-.09	.26	10	0
12	-79.43	.1654	.009	.0515	.008	.1139	-.14	.74	10	0
14	-83.56	.1591	.012	.0430	.008	.1162	-.28	.94	10	0
16	-87.10	.1589	.010	.0387	.007	.1201	-1.01	1.07	8	0
18	-88.81	.1547	.005	.0253	.011	.1295	-1.56	2.68	5	0

STATION AMUNDSEN-SCOTT, SEPTEMBER 1963
ELEVATION=2.8000 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-50.13	.4485	.055	.4167	.073	.0318	0	0	4	0
2										
4	-39.63	.2350	.017	.1657	.021	.0694	.39	.31	4	.13
6	-53.15	.2164	.013	.1134	.014	.1030	-1.33	.17	4	0
8	-66.74	.1939	.009	.0789	.004	.1150	-.61	.33	4	0
10	-74.68	.1810	.007	.0616	.002	.1193	-.29	.10	4	0
12	-78.10	.1708	.007	.0545	.003	.1163	.28	.08	4	0
14	-81.96	.1657	.005	.0458	.004	.1199	-.47	1.41	4	0
16	-84.71	.1586	.002	.0383	.001	.1202	-.71	1.07	3	0
18	-84.74	.1610	.004	.0302	.002	.1308	-2.63	1.12	2	0
20	-85.06	.1680	.000	.0261	0	.1420	-2.45	.00	1	0

STATION WILKES, MARCH 1963
ELEVATION= .0090 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-4.30	.6102	.078	.5111	.162	.0991	0	0	3	2.16
2	-18.62	.3949	.026	.2859	.008	.1090	-2.23	2.40	3	.84
4	-32.56	.3439	.014	.2209	.073	.1230	-4.45	2.51	3	.30
6	-44.80	.3153	.010	.1617	.059	.1537	-1.24	.60	3	0
8	-54.16	.2841	.007	.1198	.045	.1643	-5.54	1.14	3	0
10	-50.73	.2797	.005	.1434	.108	.1363	1.88	4.05	3	0
12	-50.78	.2841	.008	.1373	.108	.1468	-1.01	.32	3	0
14	-56.39	.2965	.025	.1680	.118	.1285	-1.32	.56	2	0
16	-62.65	.3067	0	.2289	0	.0778	-9.03	0	1	0
18	-56.77	.3433	0	.1981	0	.1452	-17.04	0	1	0
20	-52.70	.3832	.000	.1524	0	.2308	-30.39	.00	1	0

STATION WILKES, APRIL 1963
ELEVATION= .0090 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-16.16	.5162	.072	.5355	.065	-.0193	0	0	8	.84
2	-18.83	.3799	.046	.2674	.047	.1125	-3.39	1.07	8	.64
4	-29.87	.3467	.043	.1994	.050	.1473	-1.12	.54	8	.80
6	-42.12	.3158	.038	.1481	.036	.1677	-8.4	.46	8	.27
8	-53.39	.2858	.030	.1078	.021	.1780	-5.4	.61	8	0
10	-52.59	.2651	.023	.0843	.018	.1808	-1.9	.33	8	0
12	-50.83	.2640	.027	.0795	.014	.1845	-3.35	.78	8	0
14	-52.03	.2647	.027	.0749	.014	.1898	-6.8	.55	8	0
16	-53.81	.2640	.026	.0720	.012	.1920	-3.6	1.88	8	0
18	-54.90	.2696	.036	.0683	.013	.2013	-2.21	1.46	8	0
20	-56.17	.2768	.048	.0680	.021	.2088	-2.41	3.68	8	0
22	-57.29	.2847	.061	.0719	.037	.2128	-1.77	2.86	8	0
24	-56.90	.2673	.046	.0602	.024	.2071	-1.99	3.34	6	0
26	-56.70	.2869	.059	.0614	.034	.2255	-13.11	4.16	5	0
28	-53.45	.3110	.051	.0709	.050	.2401	-2.68	34.33	4	0
30	-51.31	.3594	.005	.0954	.033	.2640	-31.69	7.64	2	0
32	-51.01	.3684	.000	.1159	.000	.2526	-30.82	0	1	0
34	-51.52	.3809	0	.1247	0	.2562	-10.20	0	1	0
36	-50.66	.3671	.000	.1298	0	.2373	72.19	0	1	0

STATION WILKES, MAY 1963
ELEVATION= .0090 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-16.84	.4928	.074	.4906	.069	.0021	0	0	9	.91
2	-18.23	.3630	.029	.2999	.072	.0631	-1.54	1.34	9	.76
4	-26.57	.3343	.026	.2543	.074	.0800	-5.55	.39	9	.58
6	-38.82	.3016	.029	.1744	.056	.1272	-1.93	1.47	9	.34
8	-51.16	.2741	.020	.1176	.031	.1565	-1.51	.84	9	0
10	-57.25	.2531	.013	.0877	.014	.1654	-6.0	.69	9	0
12	-57.20	.2403	.020	.0749	.010	.1654	-7.01	.70	9	0
14	-57.47	.2449	.014	.0700	.011	.1749	-7.2	.90	8	0
16	-59.56	.2466	.018	.0653	.008	.1813	-4.44	.90	6	0
18	-61.23	.2448	.025	.0609	.010	.1839	-5.9	2.19	6	0
20	-63.35	.2564	.021	.0556	.012	.2008	-3.18	2.43	5	0
22	-65.23	.2675	.030	.0566	.013	.2108	-4.66	.51	3	0
24	-66.26	.2409	0	.0427	0	.1981	2.53	.00	1	0
26	-67.10	.2316	.000	.0484	.000	.1832	12.53	.00	1	0

STATION WILKES, JUNE 1963
ELEVATION= .0090 KM

HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-12.90	.4507	.063	.4378	.126	.0129	0	0	7	1.38
2	-17.98	.3618	.030	.2799	.069	.0819	-1.73	3.25	7	.98
4	-30.88	.3277	.024	.2228	.051	.1049	-.74	1.01	7	.43
6	-43.12	.2972	.024	.1609	.036	.1364	-1.28	.98	7	.21
8	-57.36	.2660	.026	.1125	.023	.1535	-.88	.36	7	0
10	-65.44	.2340	.031	.0803	.011	.1537	-.02	.59	7	0
12	-64.72	.2229	.033	.0678	.009	.1551	-.11	.82	7	0
14	-67.66	.2142	.030	.0671	.008	.1470	1.01	.92	7	0
16	-70.06	.2022	.017	.0675	.010	.1347	.76	.47	5	0
18	-72.74	.2023	.019	.0624	.014	.1400	-1.26	2.47	5	0
20	-72.91	.2202	.011	.0498	.015	.1703	.18	1.63	2	0
22	-70.07	.2225	0	.0646	0	.1579	-2.87	0	1	0

STATION WILKES, JULY 1963
ELEVATION= .0090 KM

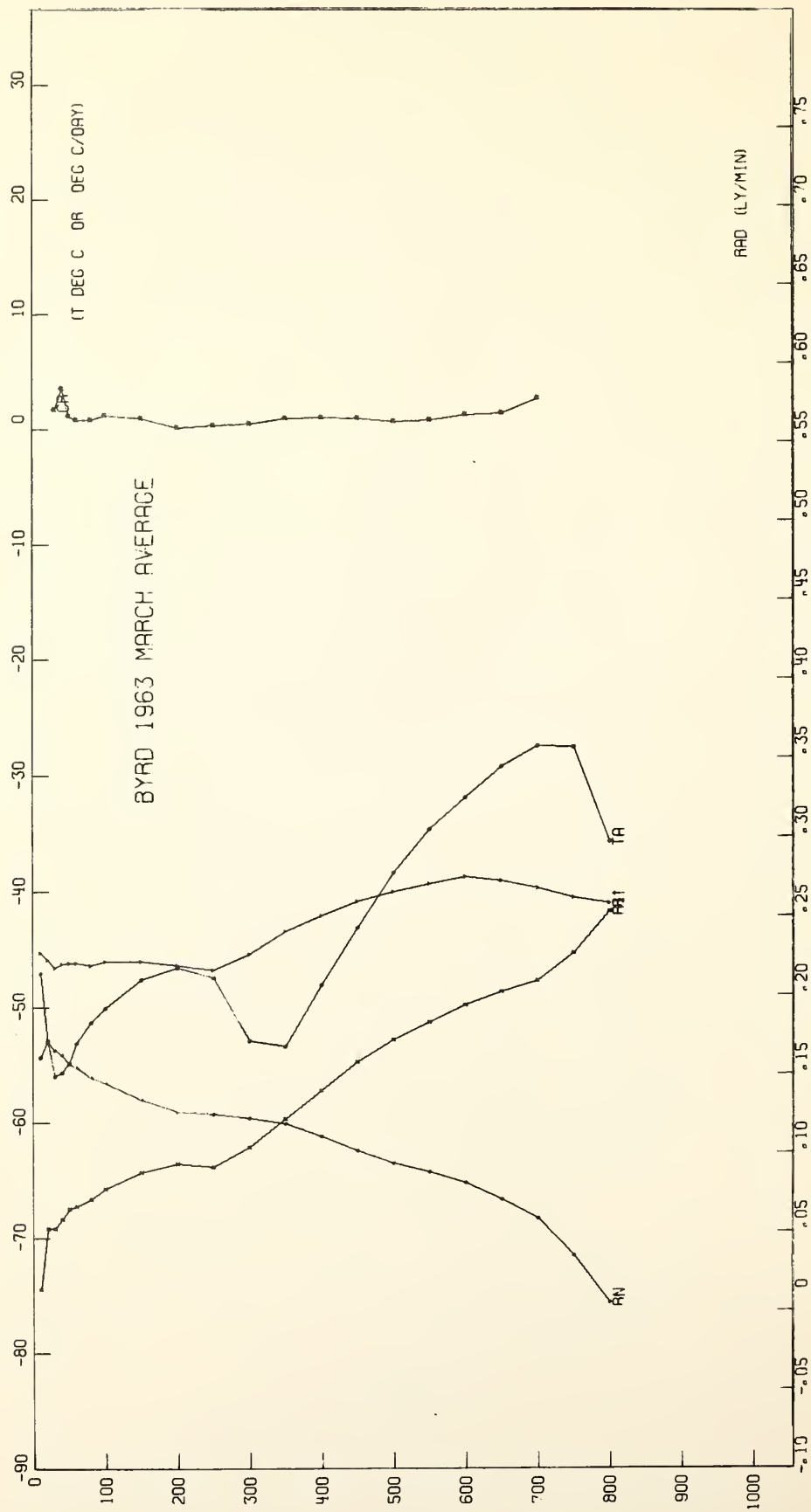
HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-15.89	.5062	.045	.5478	.053	-.0416	0	0	9	.93
2	-20.76	.3588	.023	.2692	.042	.0896	-3.35	1.54	9	.56
4	-32.33	.3308	.022	.2062	.042	.1245	-1.13	.43	9	.22
6	-45.38	.2968	.024	.1459	.034	.1509	-1.07	1.18	9	.18
8	-59.03	.2701	.022	.1030	.021	.1671	-.84	.53	9	0
10	-67.47	.2425	.023	.0788	.007	.1637	.23	.52	9	0
12	-69.50	.2282	.025	.0656	.011	.1626	.11	1.30	9	0
14	-71.67	.2252	.016	.0645	.011	.1606	.52	.88	7	0
16	-74.82	.2250	.014	.0543	.012	.1707	-.80	1.34	3	0
18	-77.95	.2384	.015	.0372	.003	.2012	-5.14	.59	2	0
20	-76.66	.2705	0	.0314	0	.2391	-10.10	.00	1	0

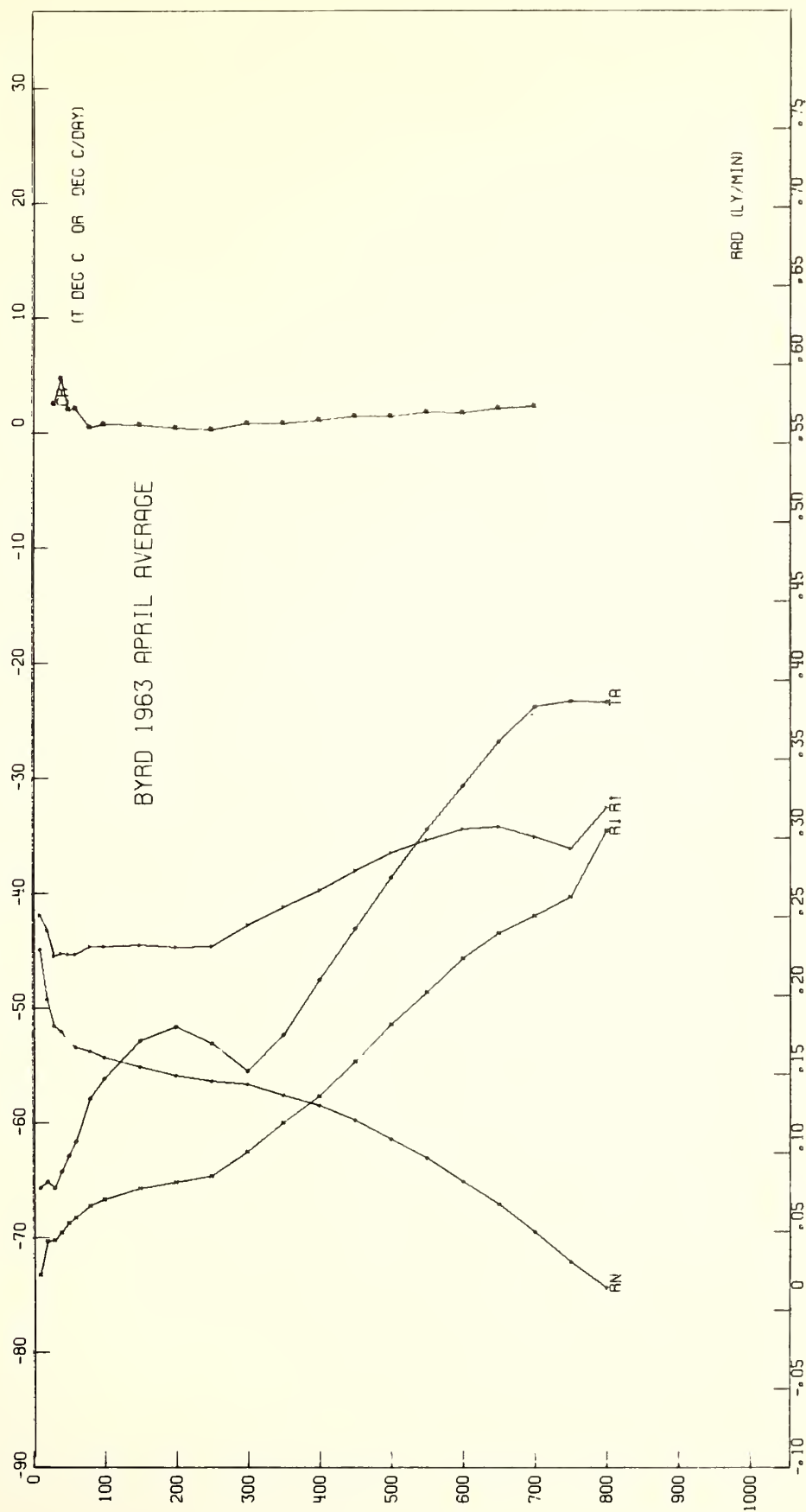
STATION WILKES, AUGUST 1963
ELEVATION= .0090 KM

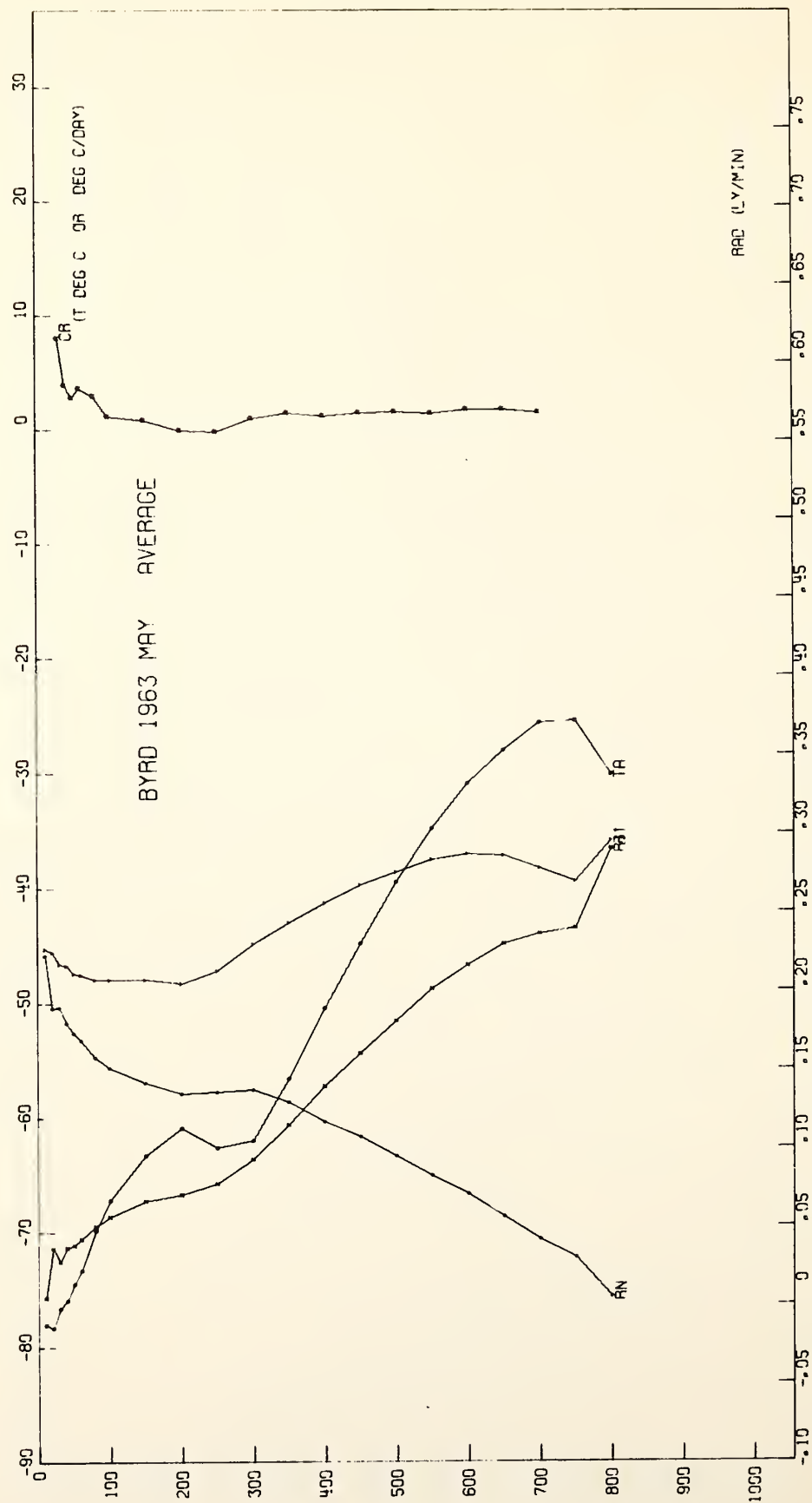
HEIGHT	TEMP	RADIATION UP		RADIATION DOWN		RADIATION NET	WARMING		COUNT	MIXING RATIO
G/KM	DEG C	LY/MIN		LY/MIN		LY/MIN	DEG C/DAY			
	MEAN	MEAN	SIGMA	MEAN	SIGMA	MEAN	MEAN	SIGMA		MEAN
SURFACE	-18.17	.4934	.068	.5064	.092	-.0129	0	0	12	.60
2	-21.50	.3592	.035	.2639	.061	.0953	-2.71	1.19	12	.44
4	-31.73	.3363	.038	.1970	.060	.1393	-1.40	.68	12	.39
6	-44.55	.3106	.034	.1408	.049	.1698	-.96	.38	11	.27
8	-57.53	.2822	.029	.0975	.026	.1848	-.76	.82	11	0
10	-67.43	.2599	.025	.0747	.016	.1852	-.02	.68	11	0
12	-73.51	.2438	.026	.0604	.011	.1834	.17	.69	11	0
14	-74.27	.2414	.024	.0493	.011	.1921	-.22	1.43	8	0
16	-77.61	.2366	.027	.0458	.013	.1908	.00	1.23	7	0
18	-77.76	.2383	.030	.0423	.010	.1960	-2.33	1.62	5	0
20	-75.14	.2627	.028	.0329	.004	.2297	-1.96	1.82	2	0
22	-74.61	.2721	.045	.0281	.005	.2439	-6.59	8.14	2	0
24	-71.74	.2771	.049	.0212	.007	.2560	-8.08	4.05	2	0

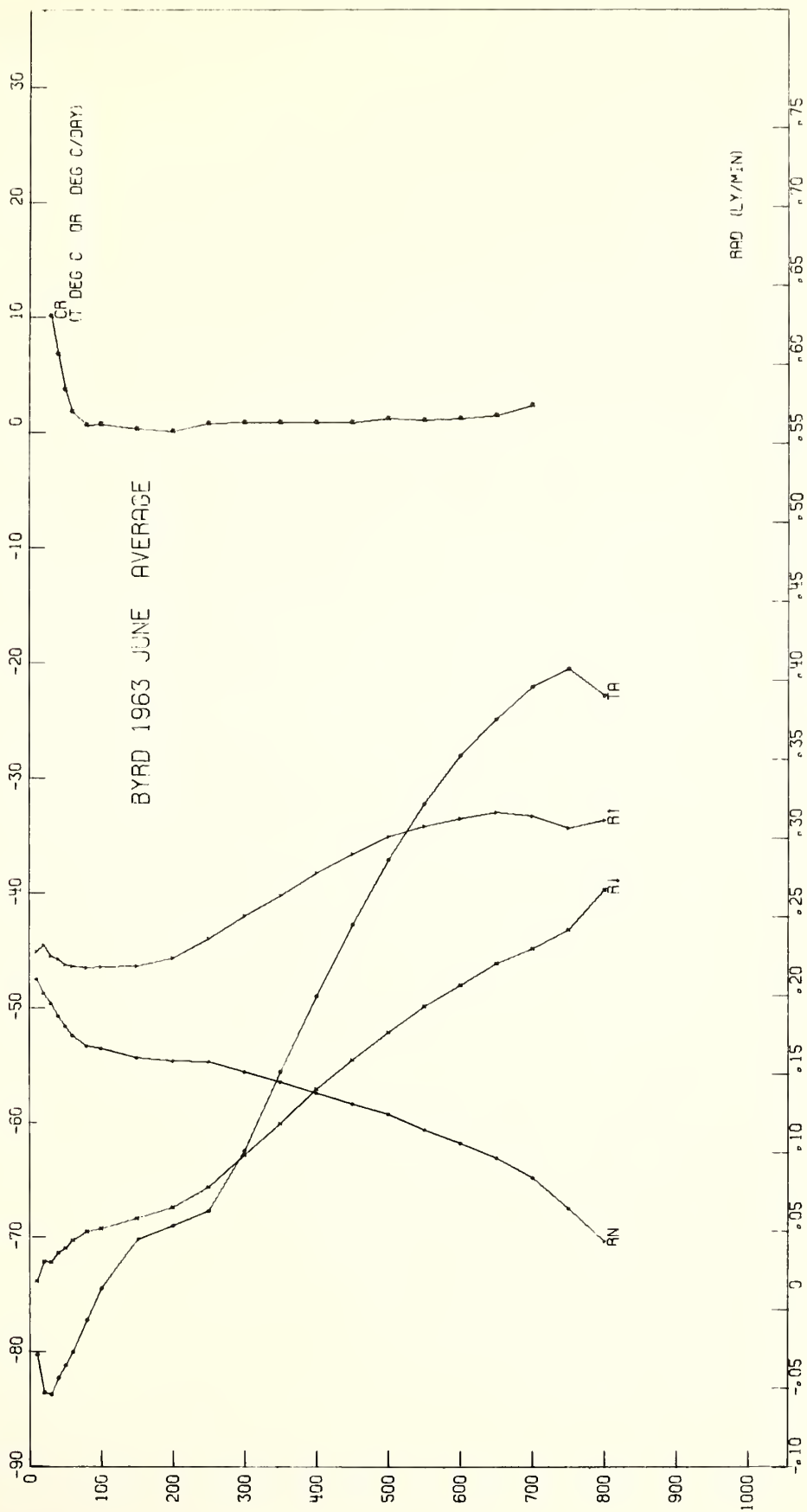
APPENDIX E

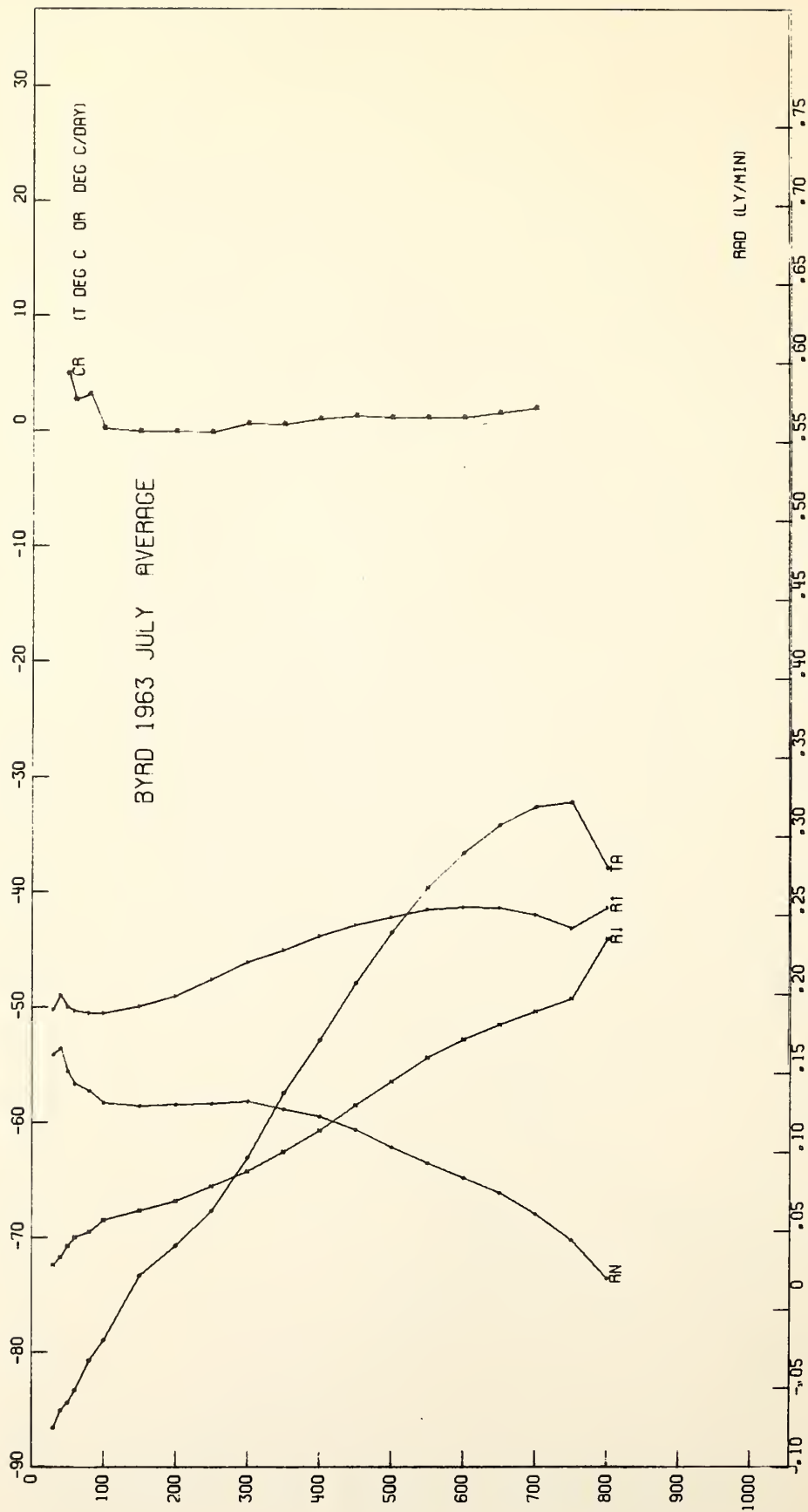
Computer Plots of Monthly Radiometersonde Data Averages by Stations

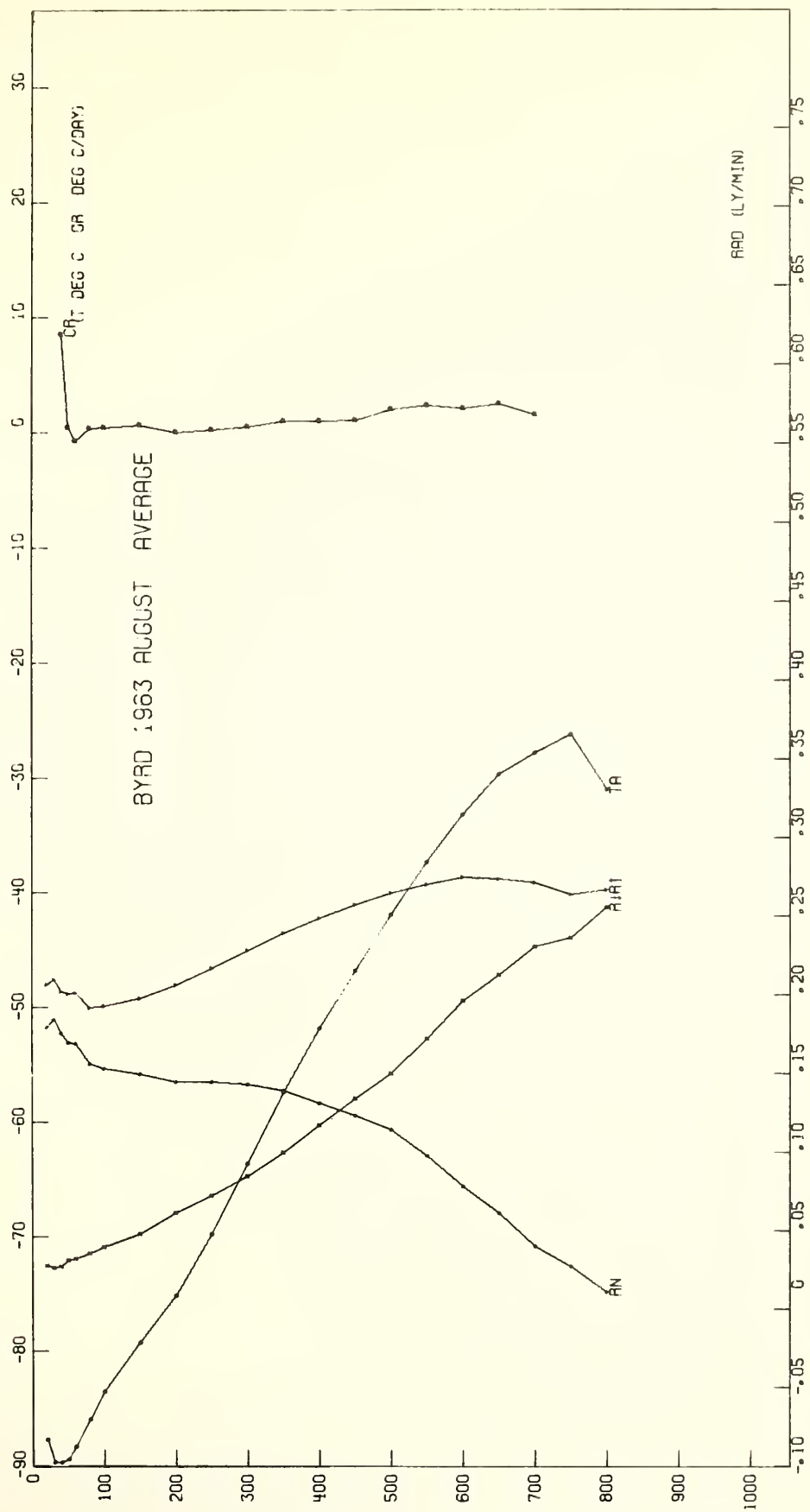


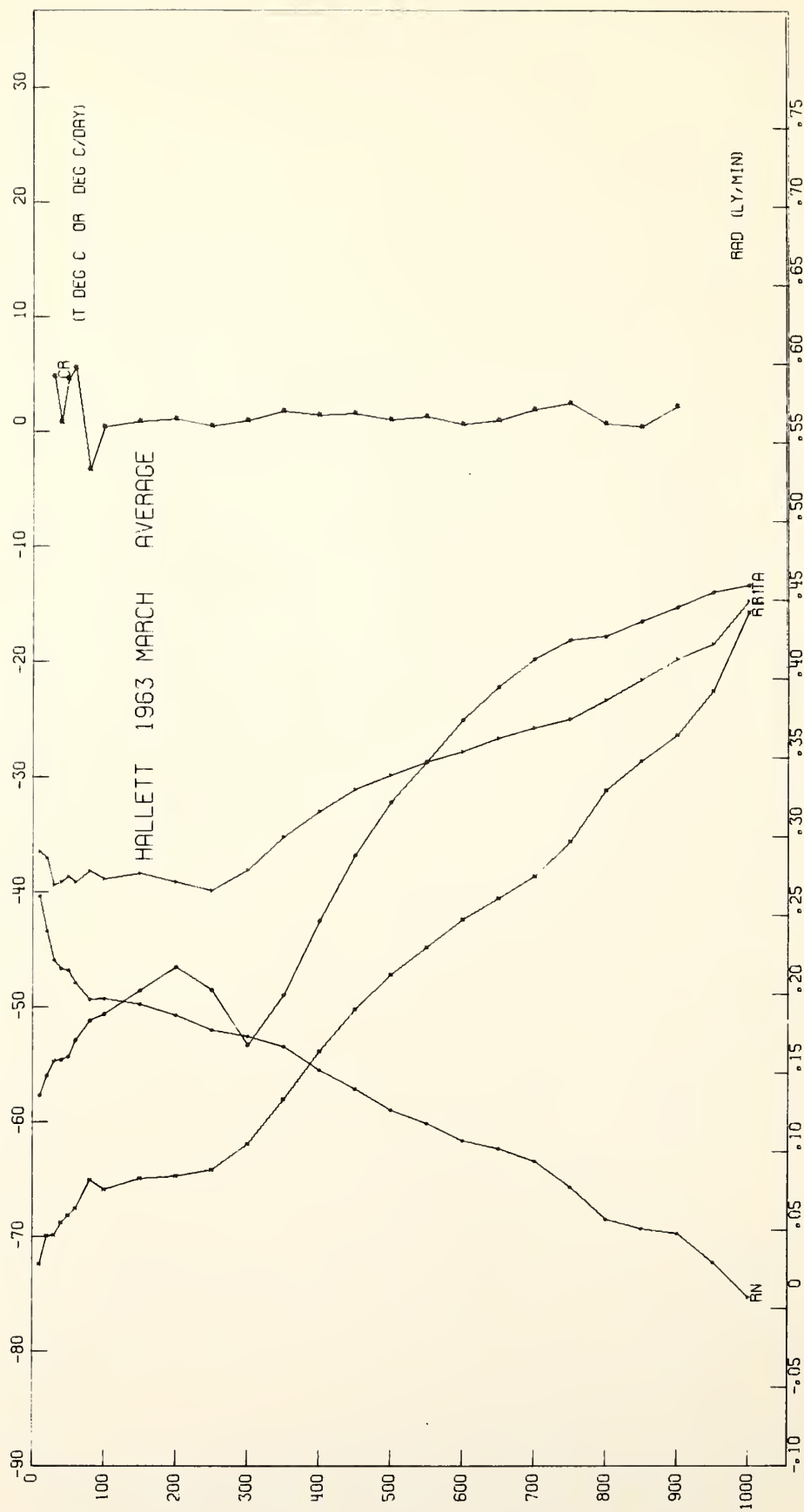


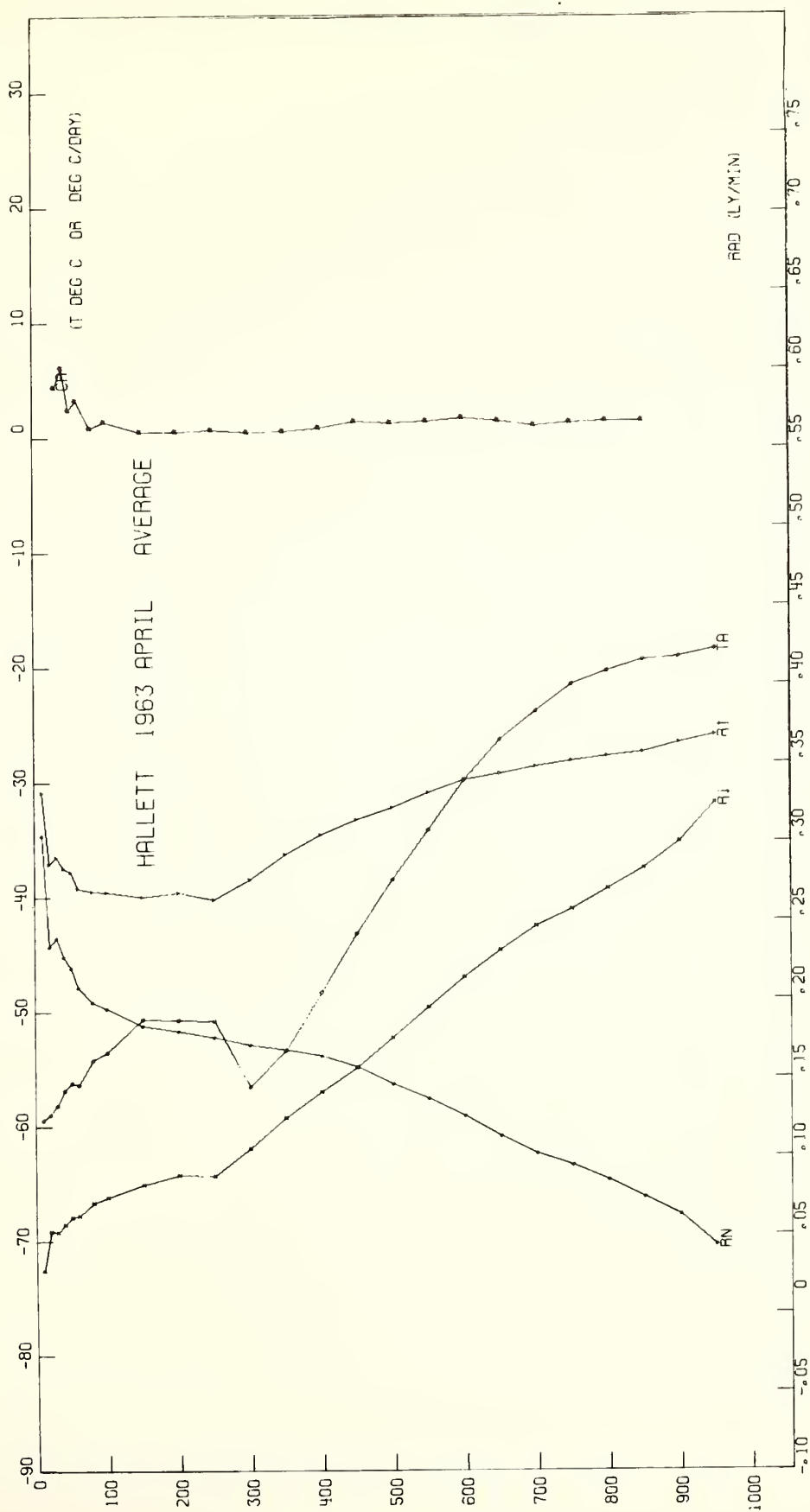


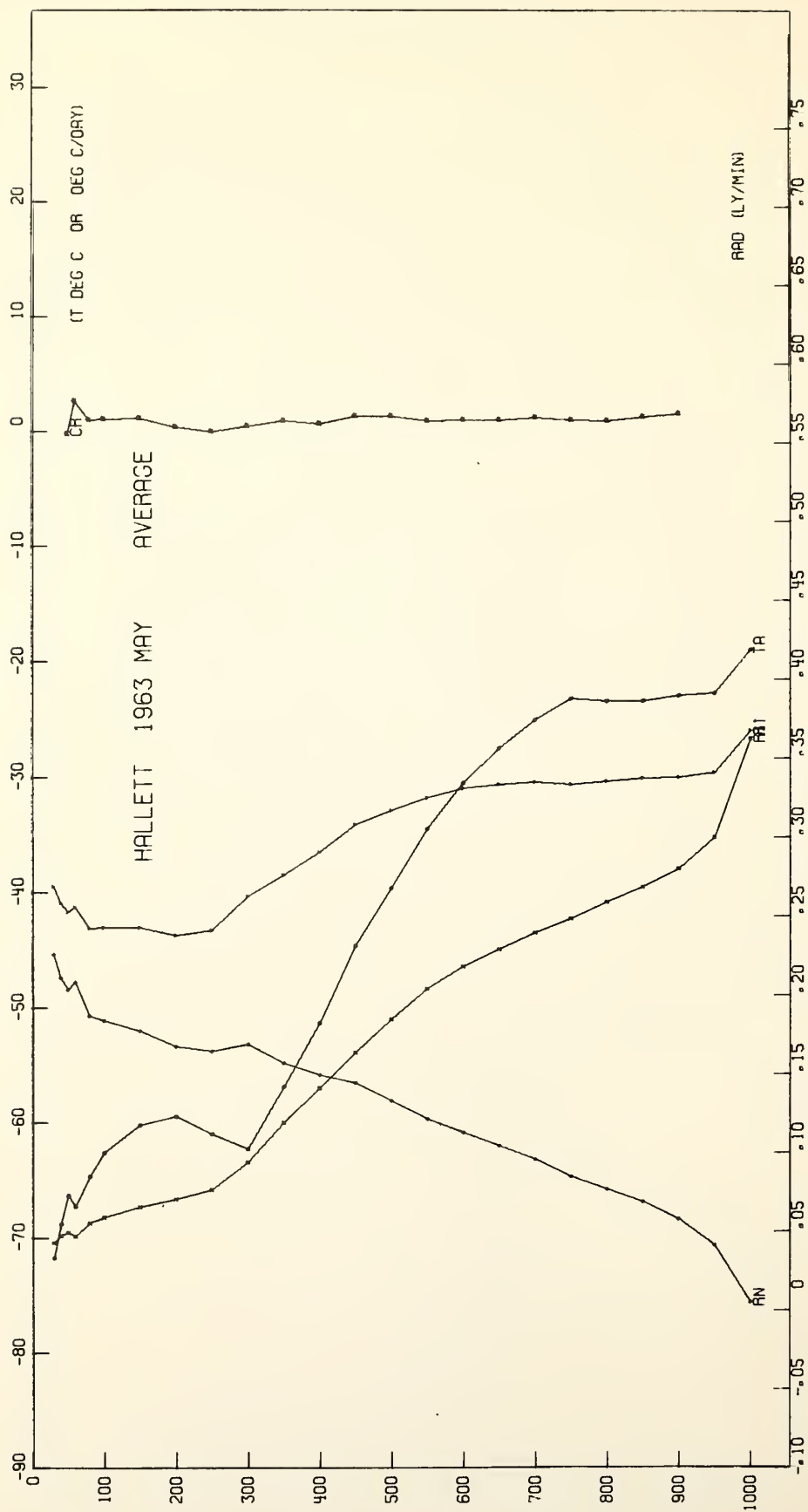


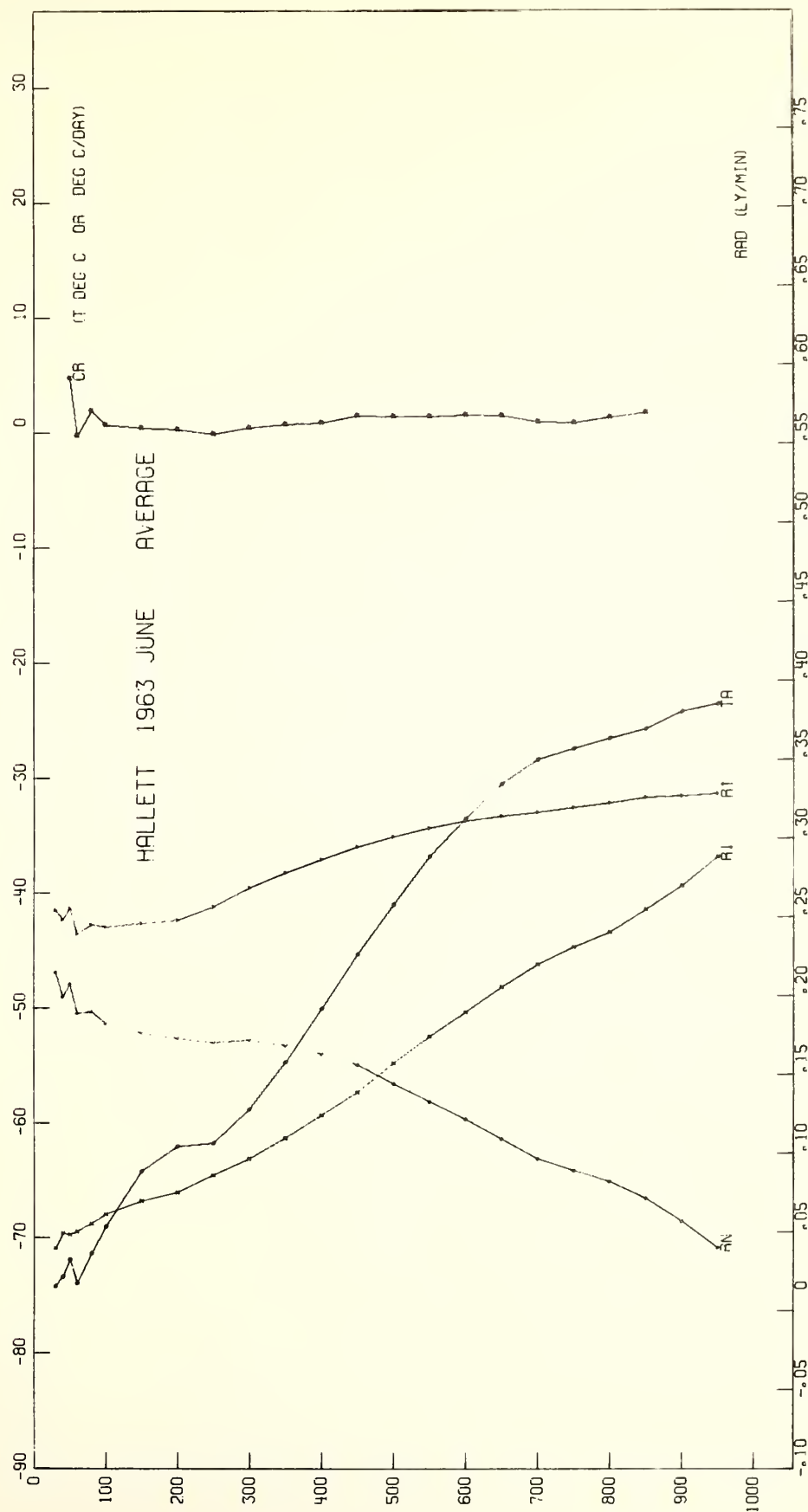


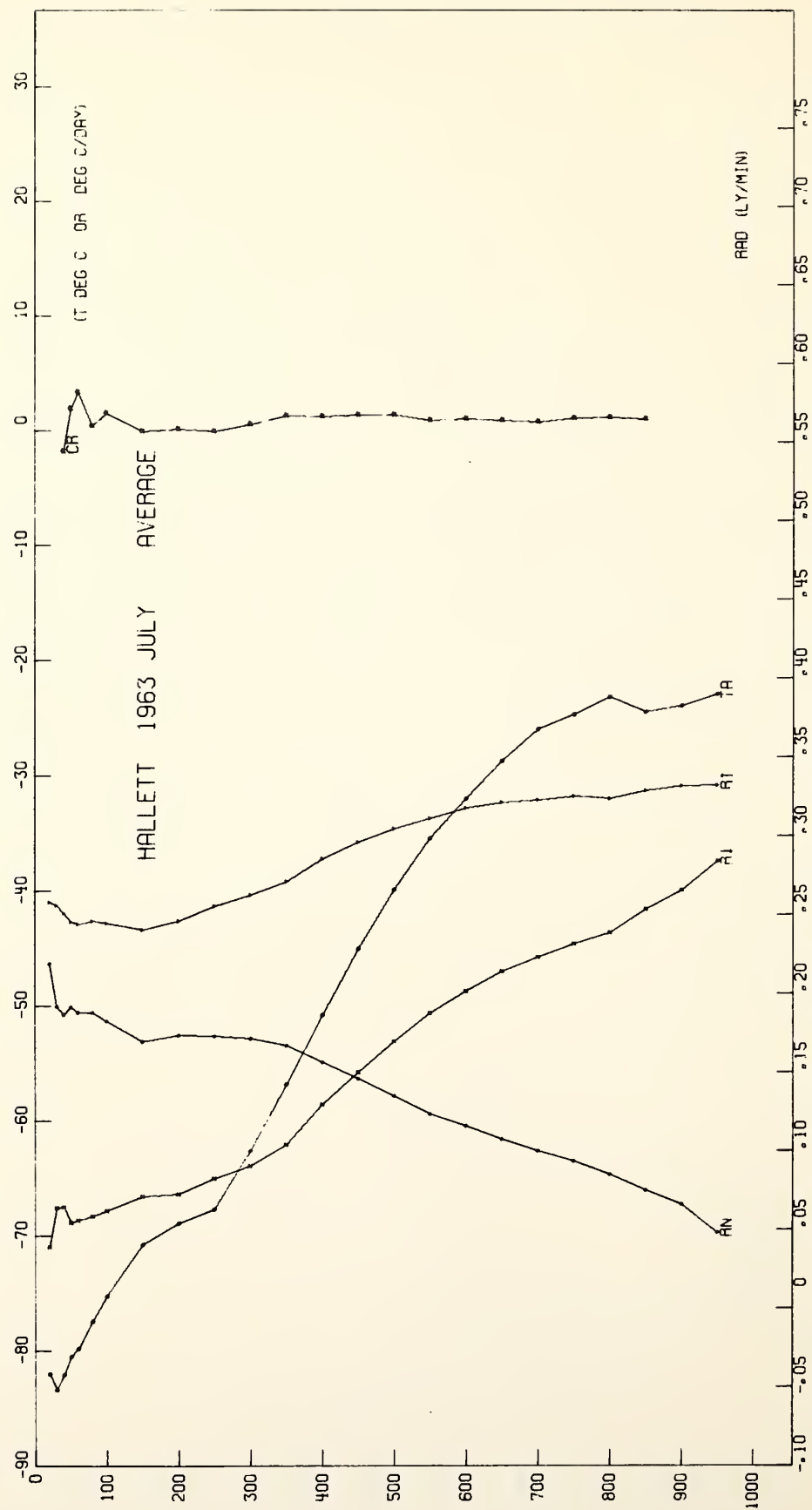


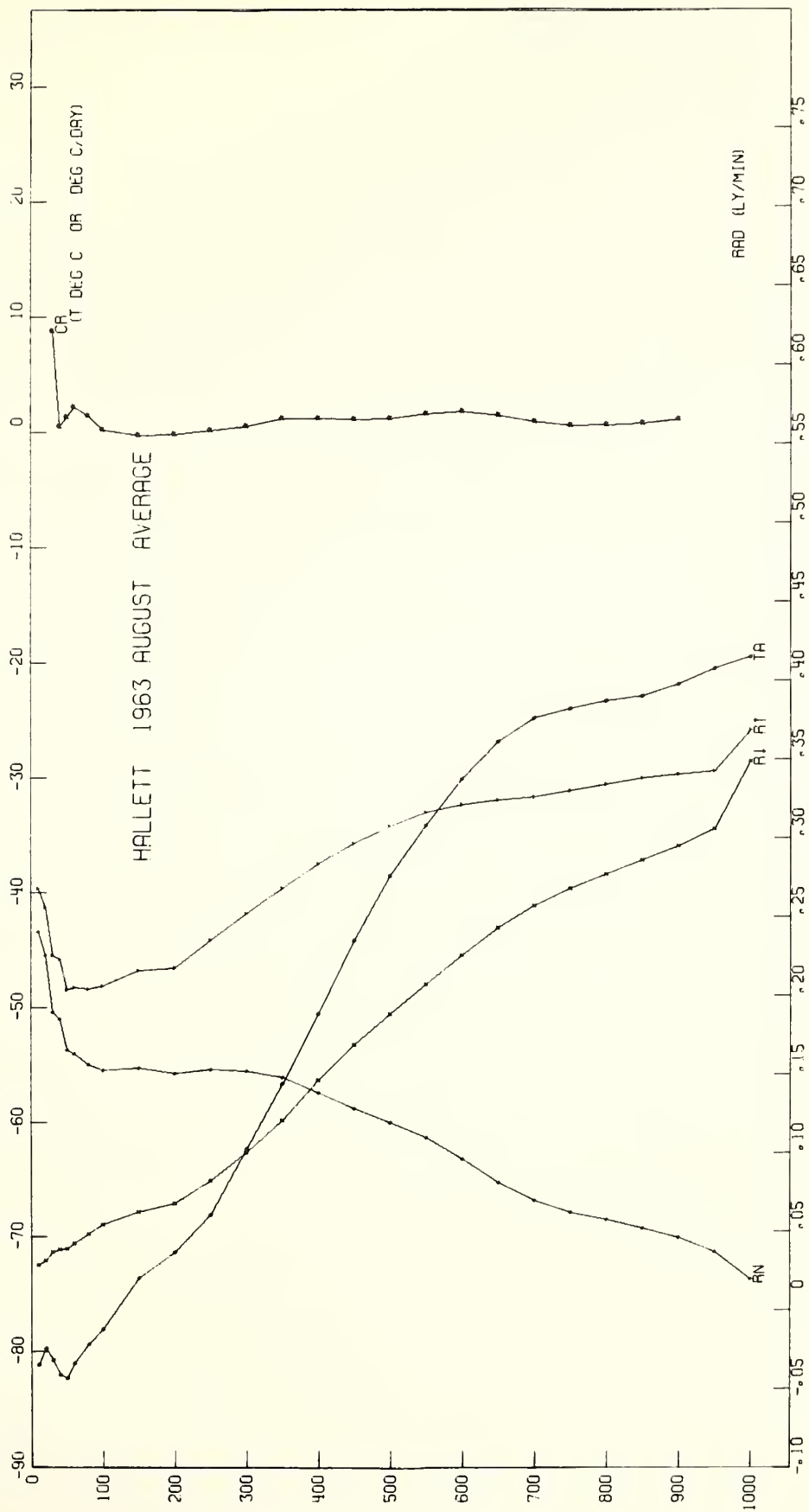


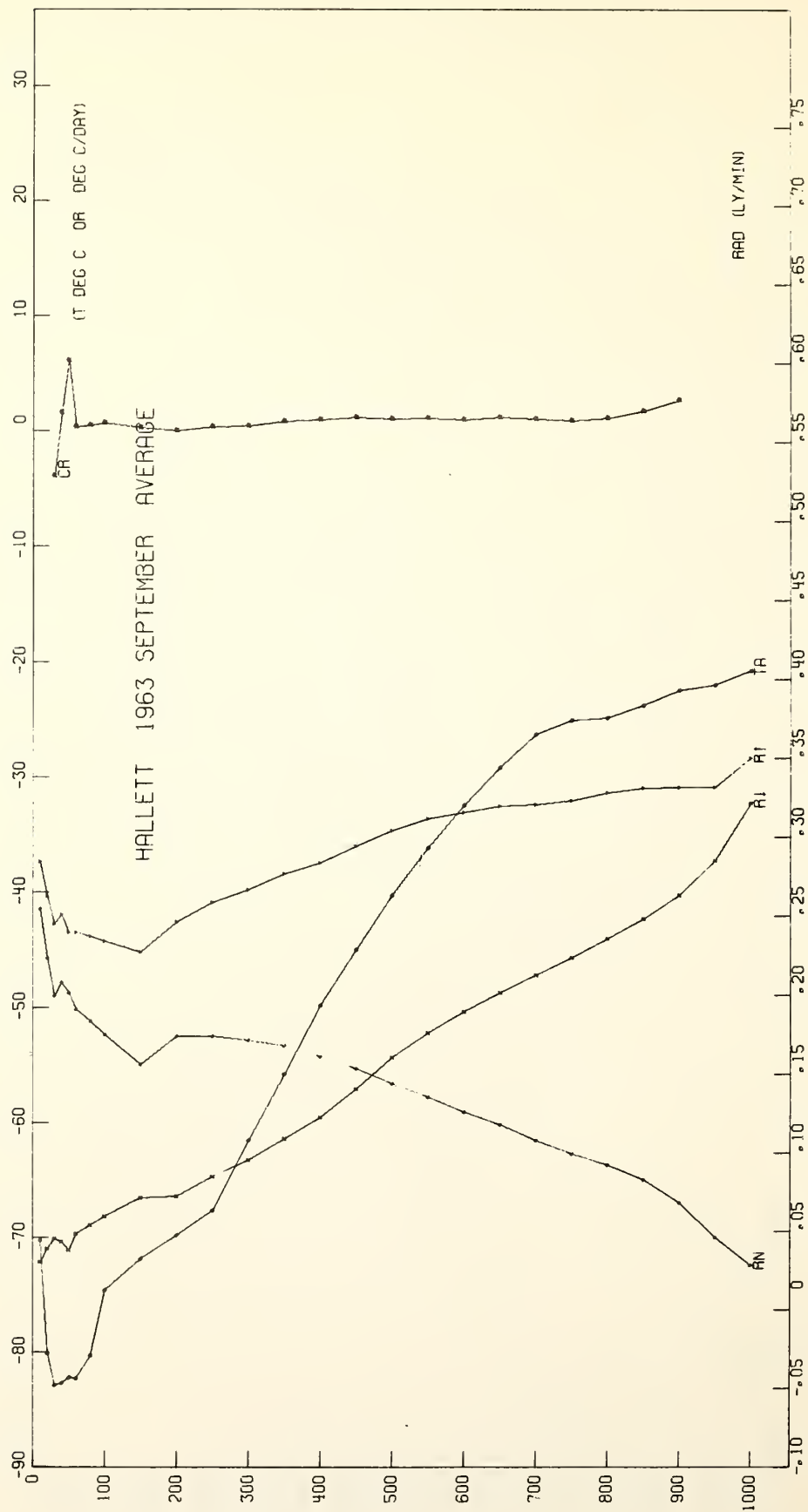


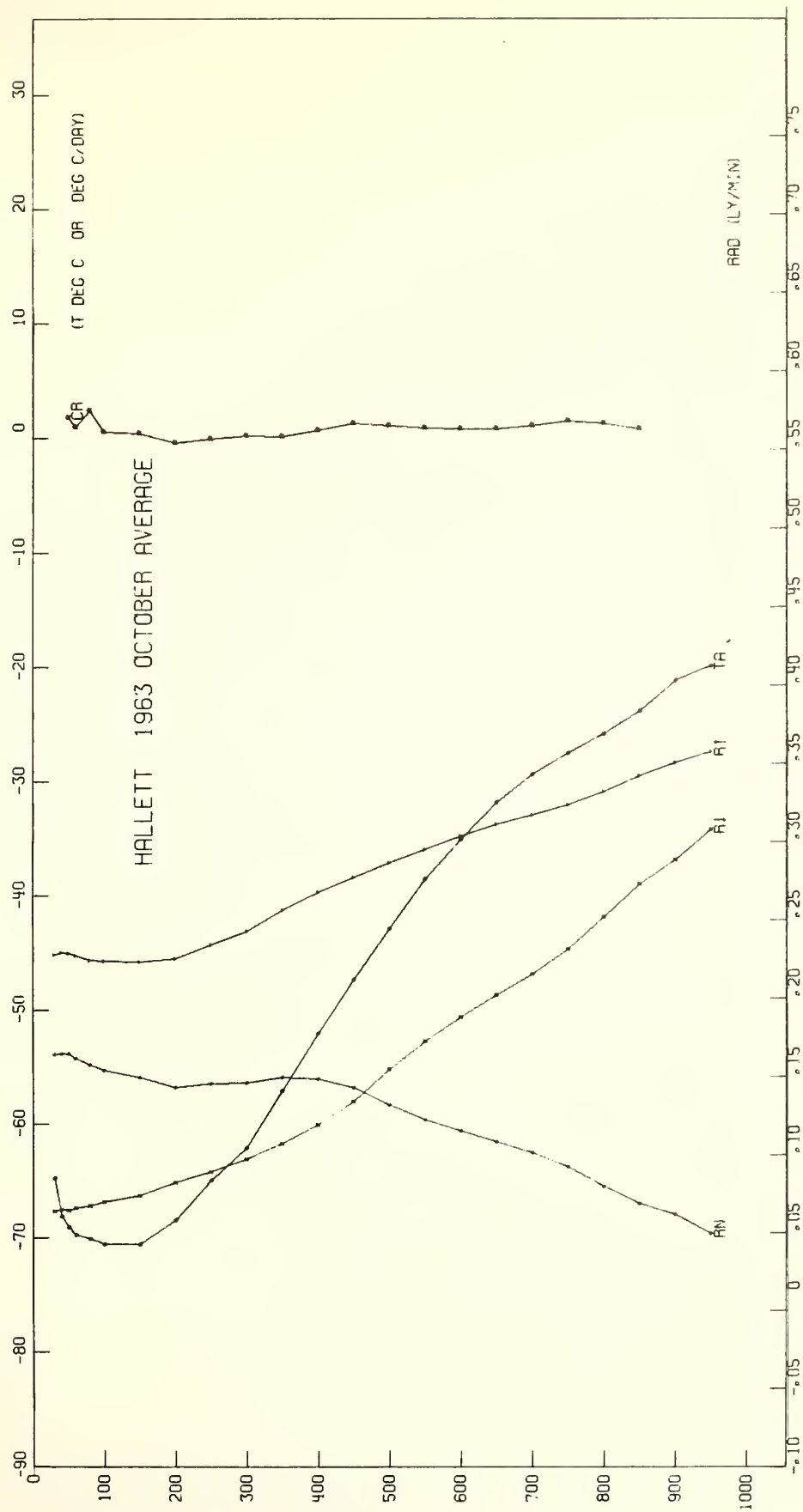


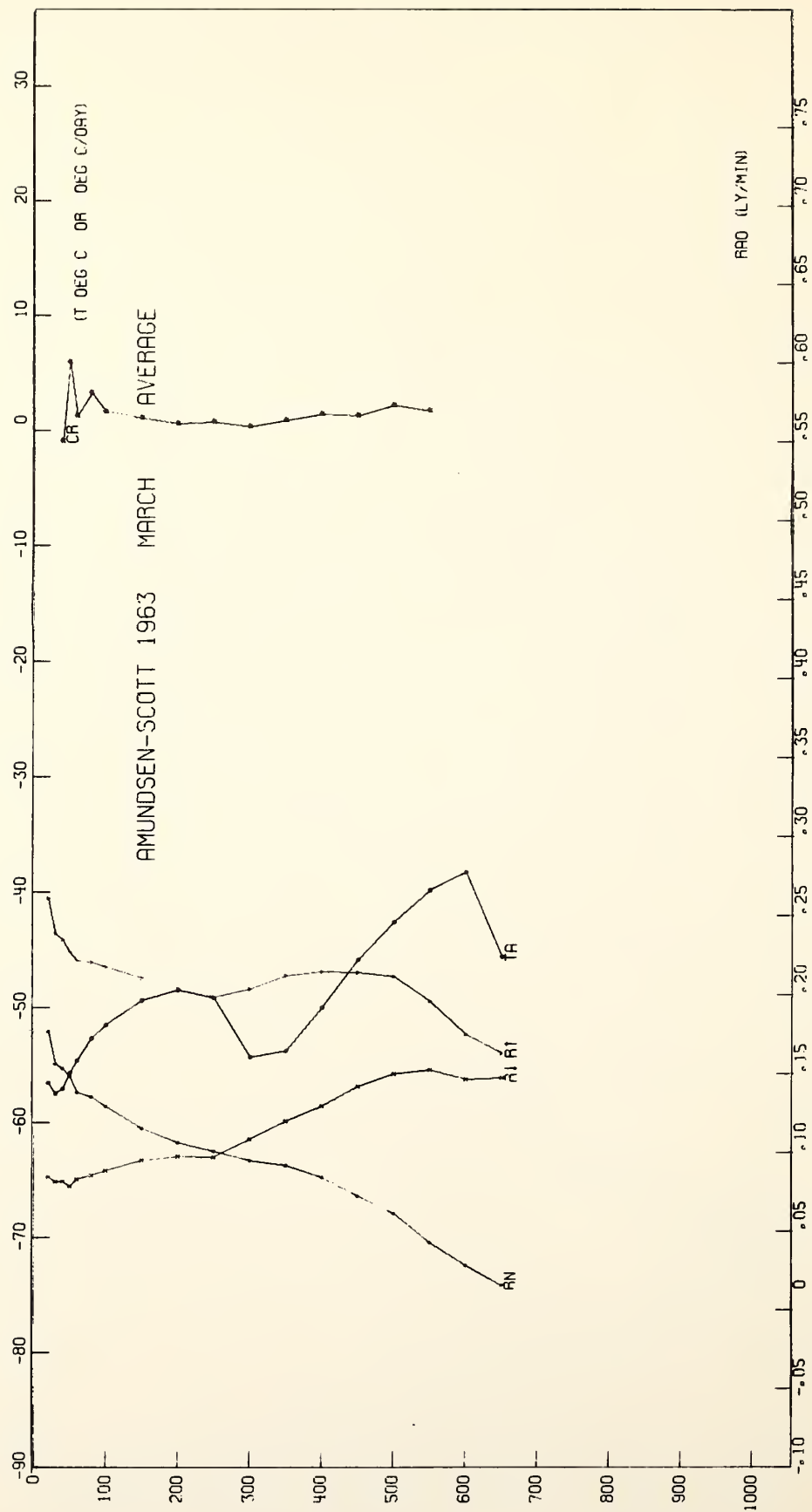


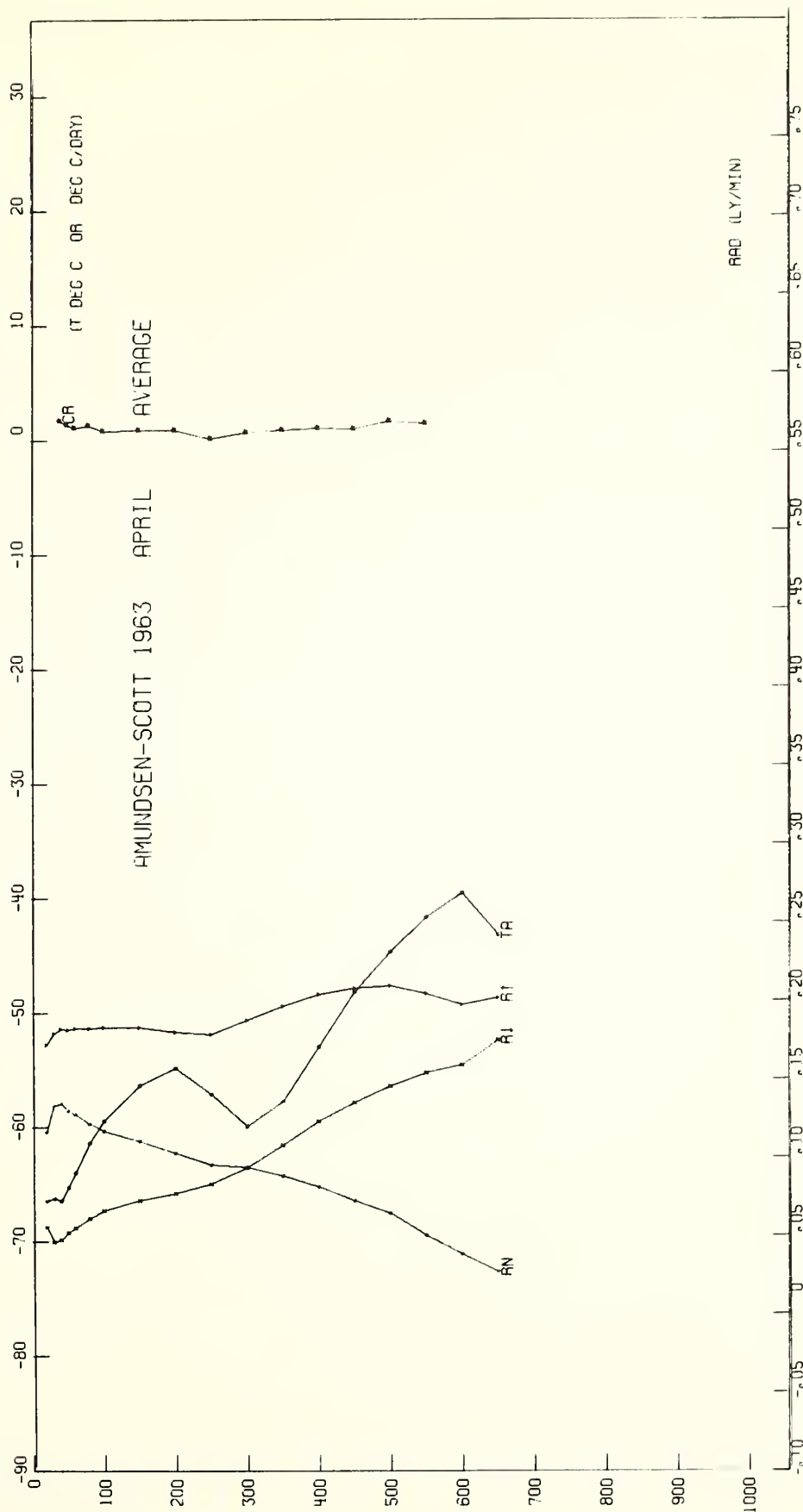


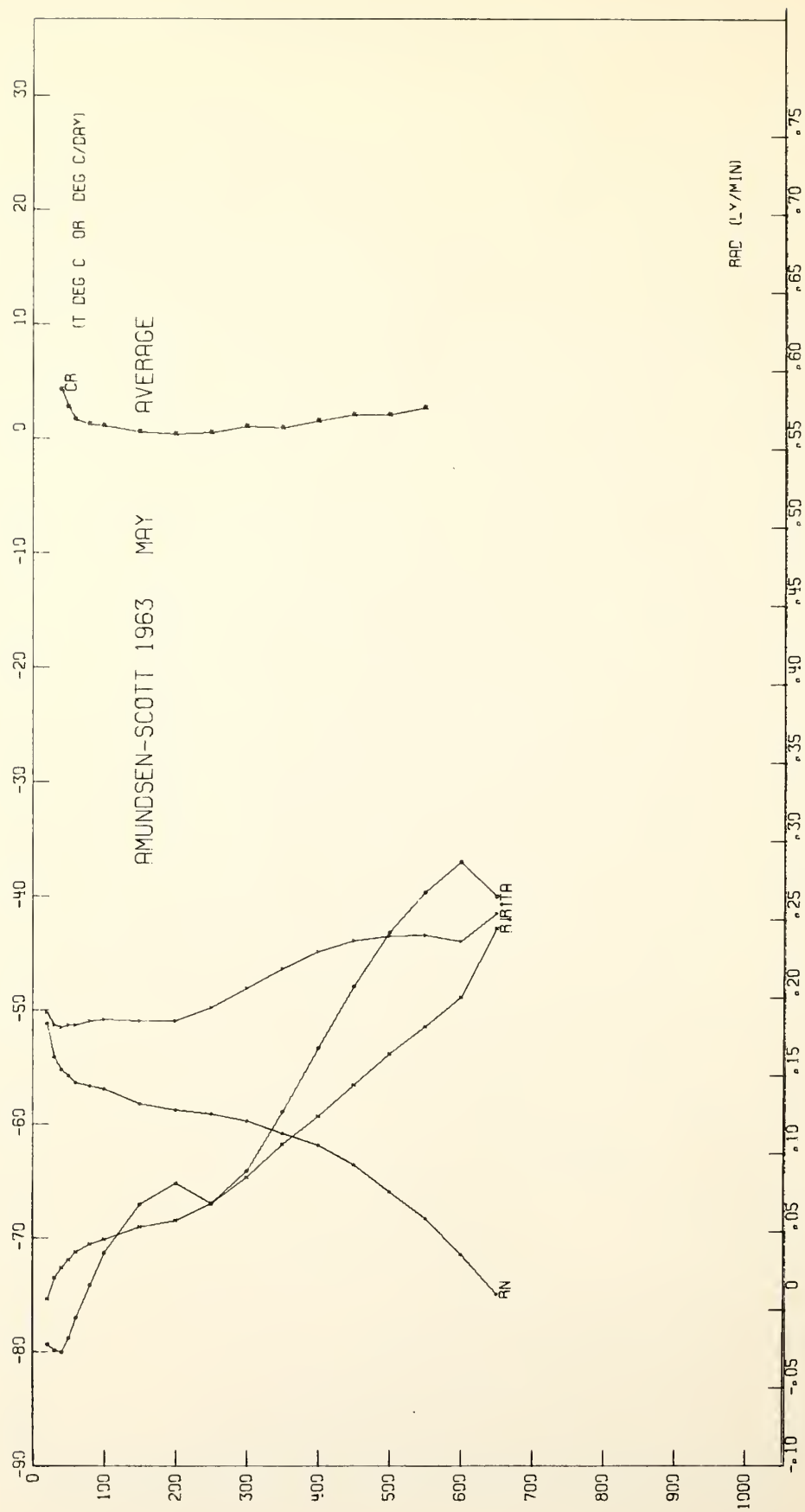


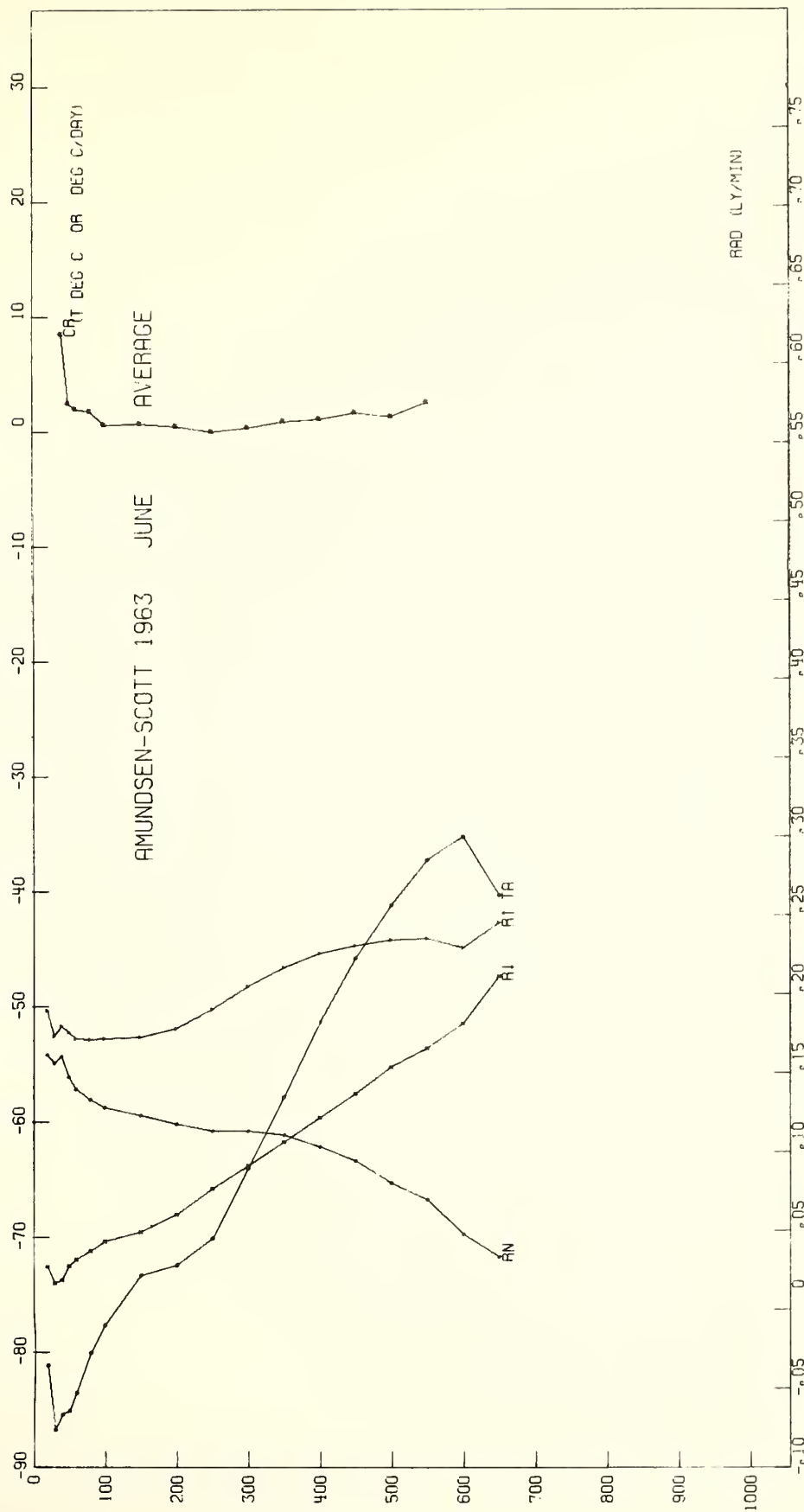


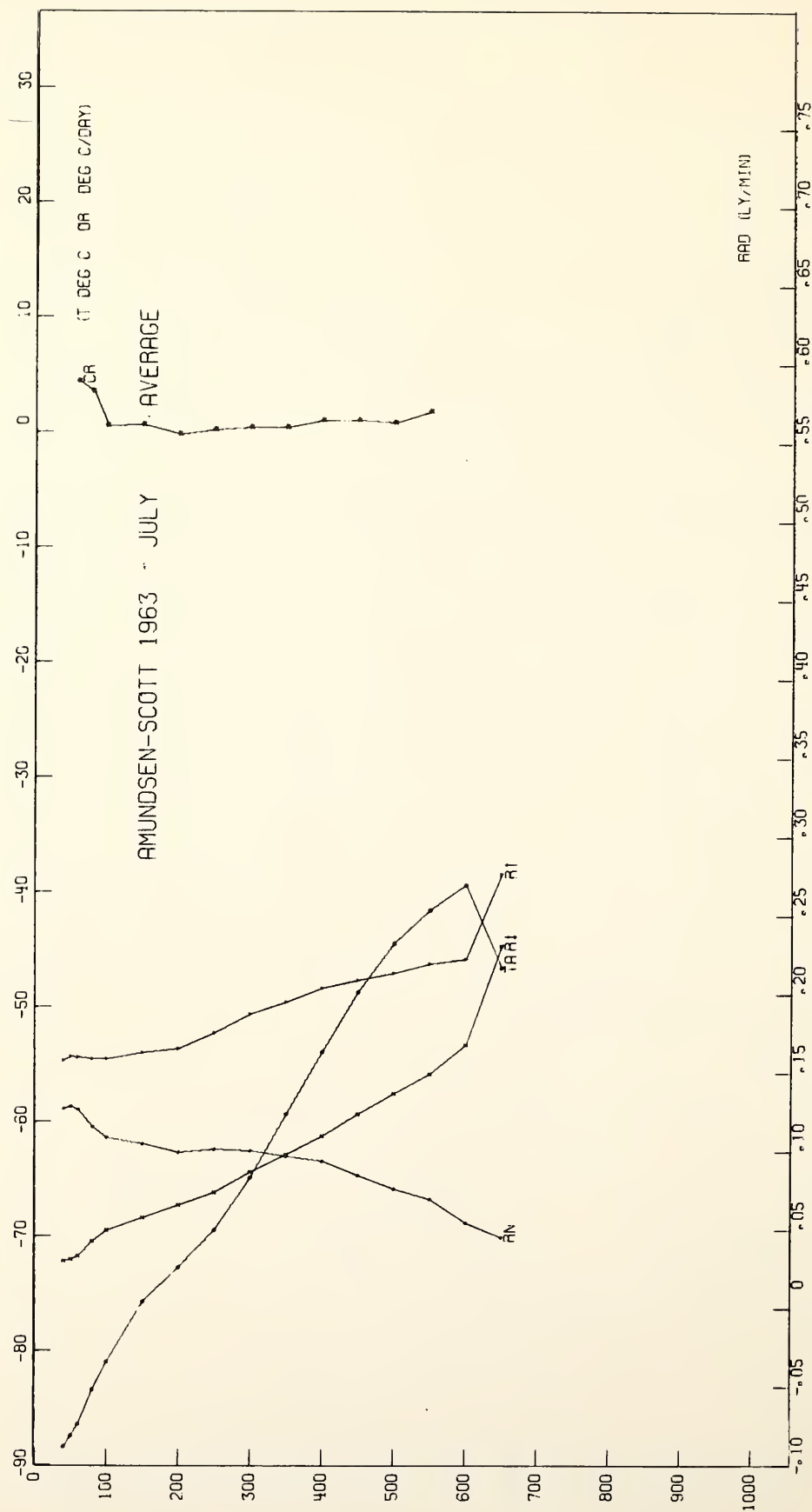


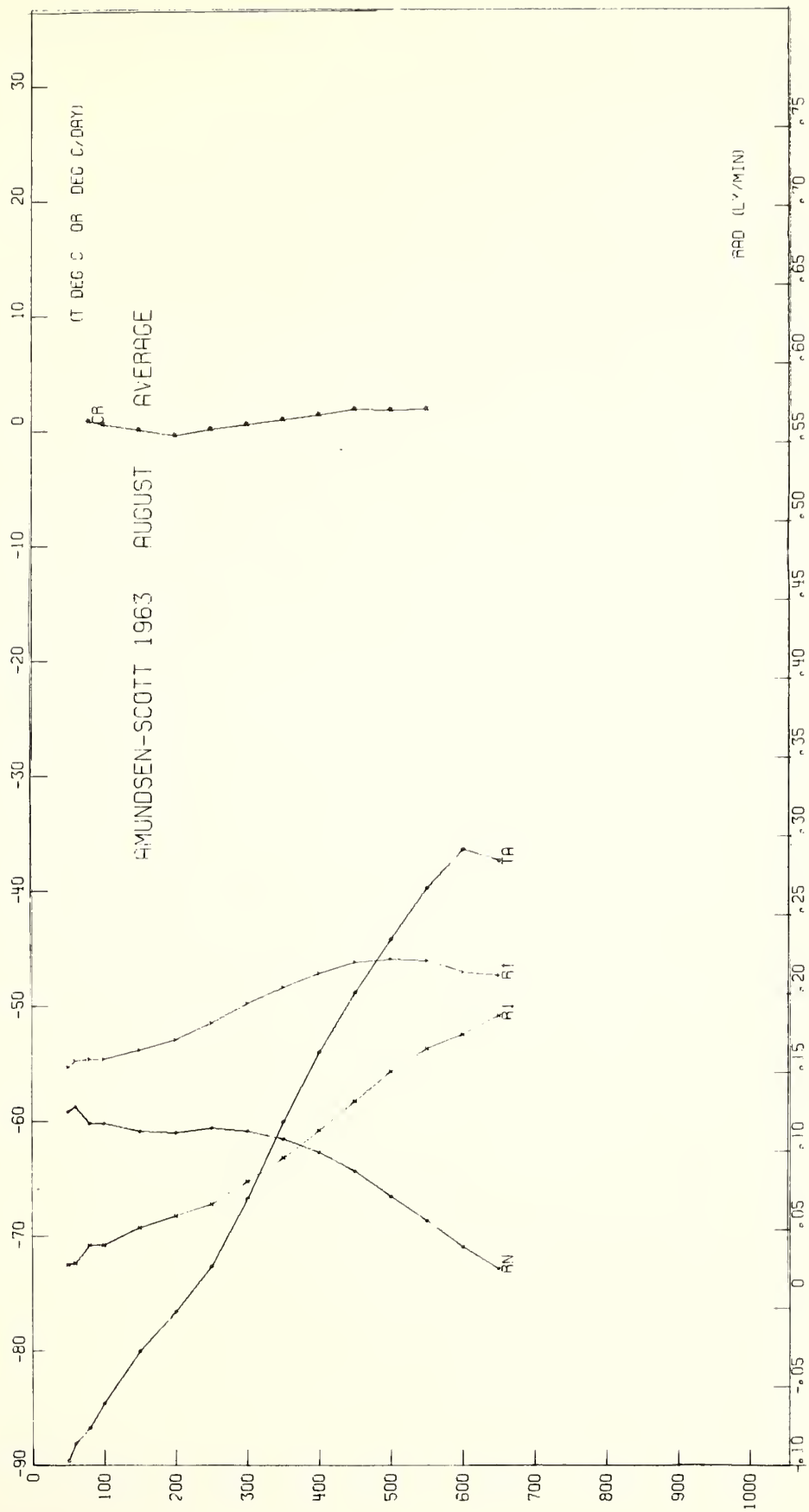


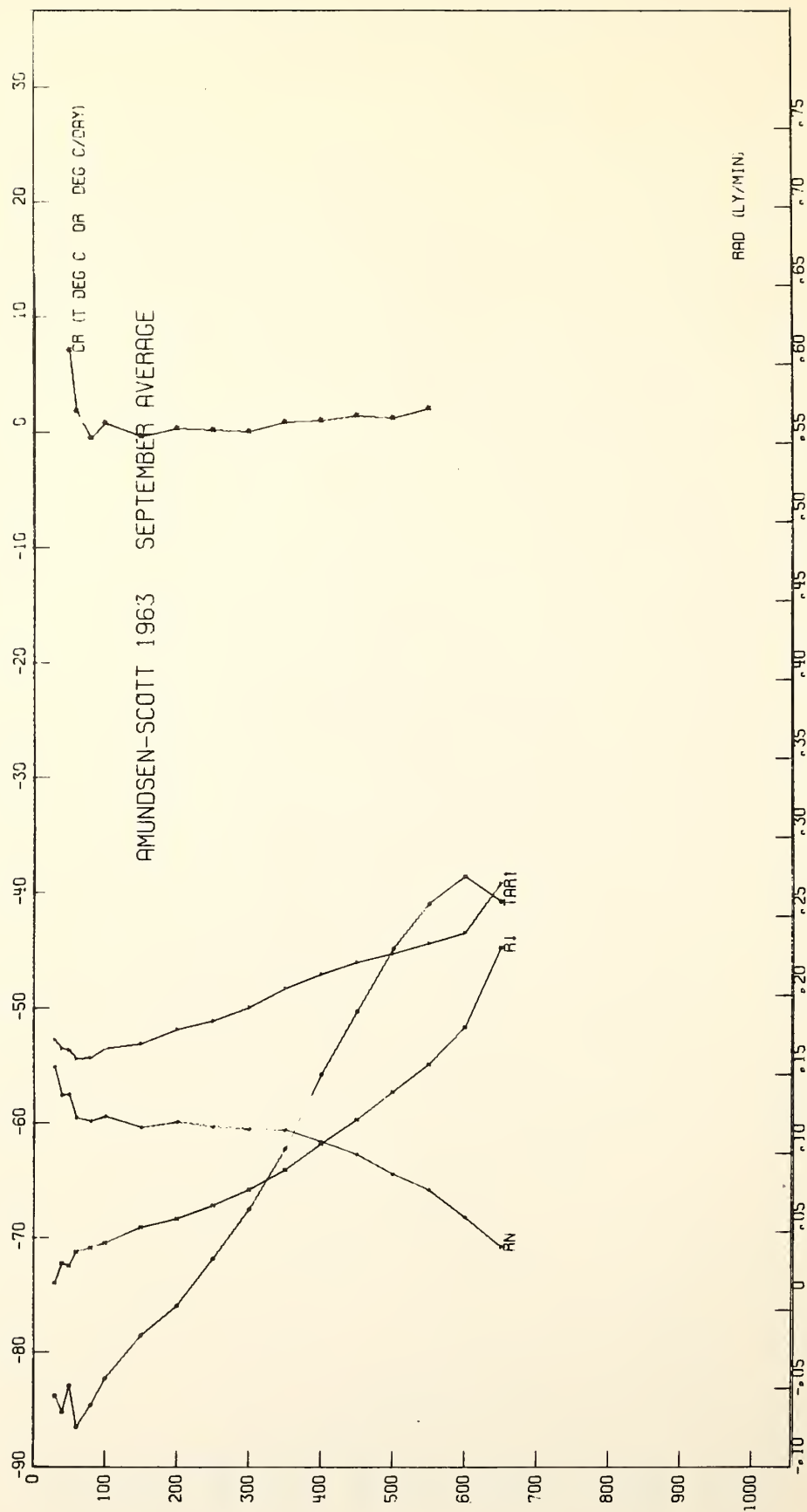


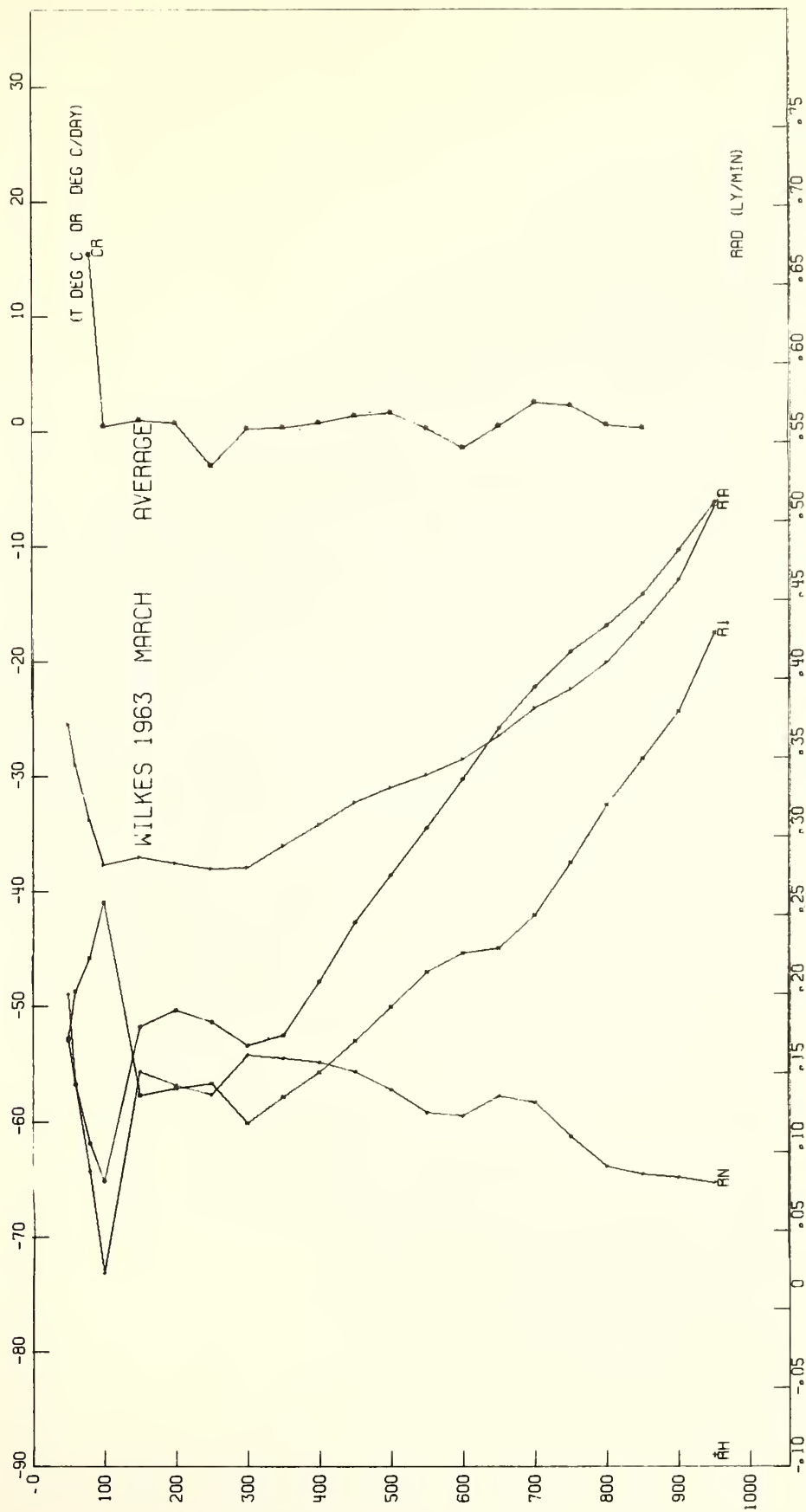


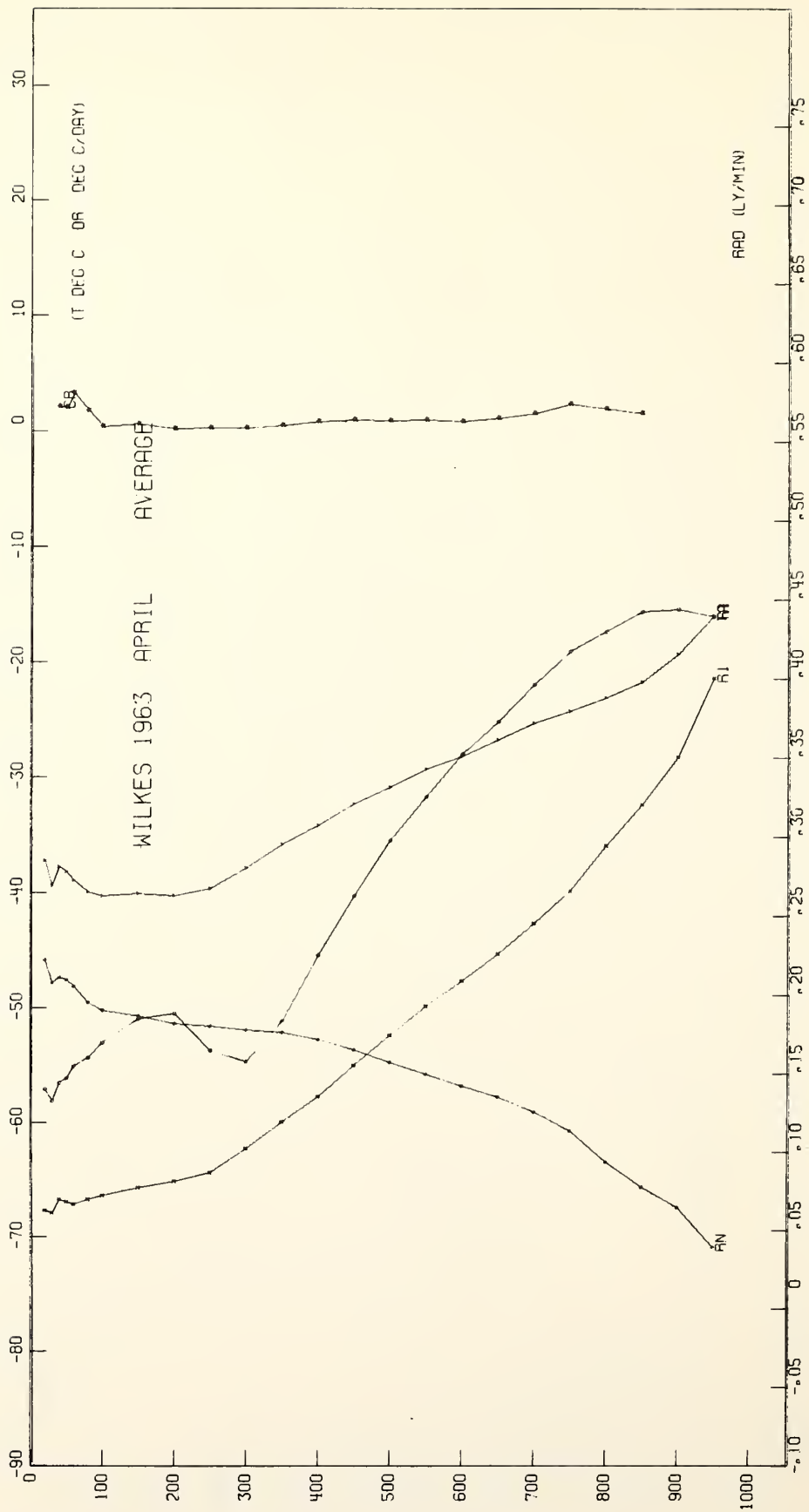


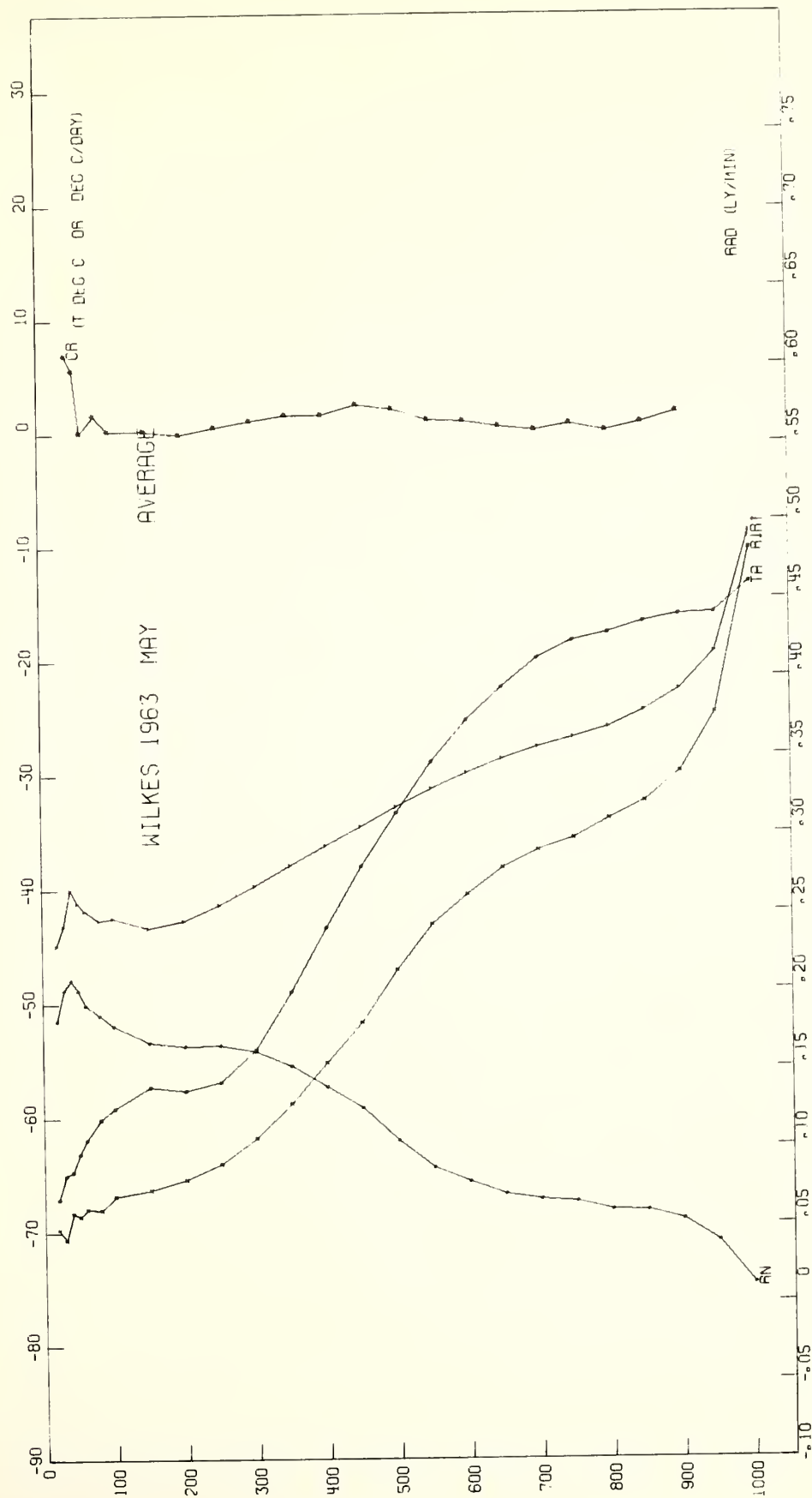


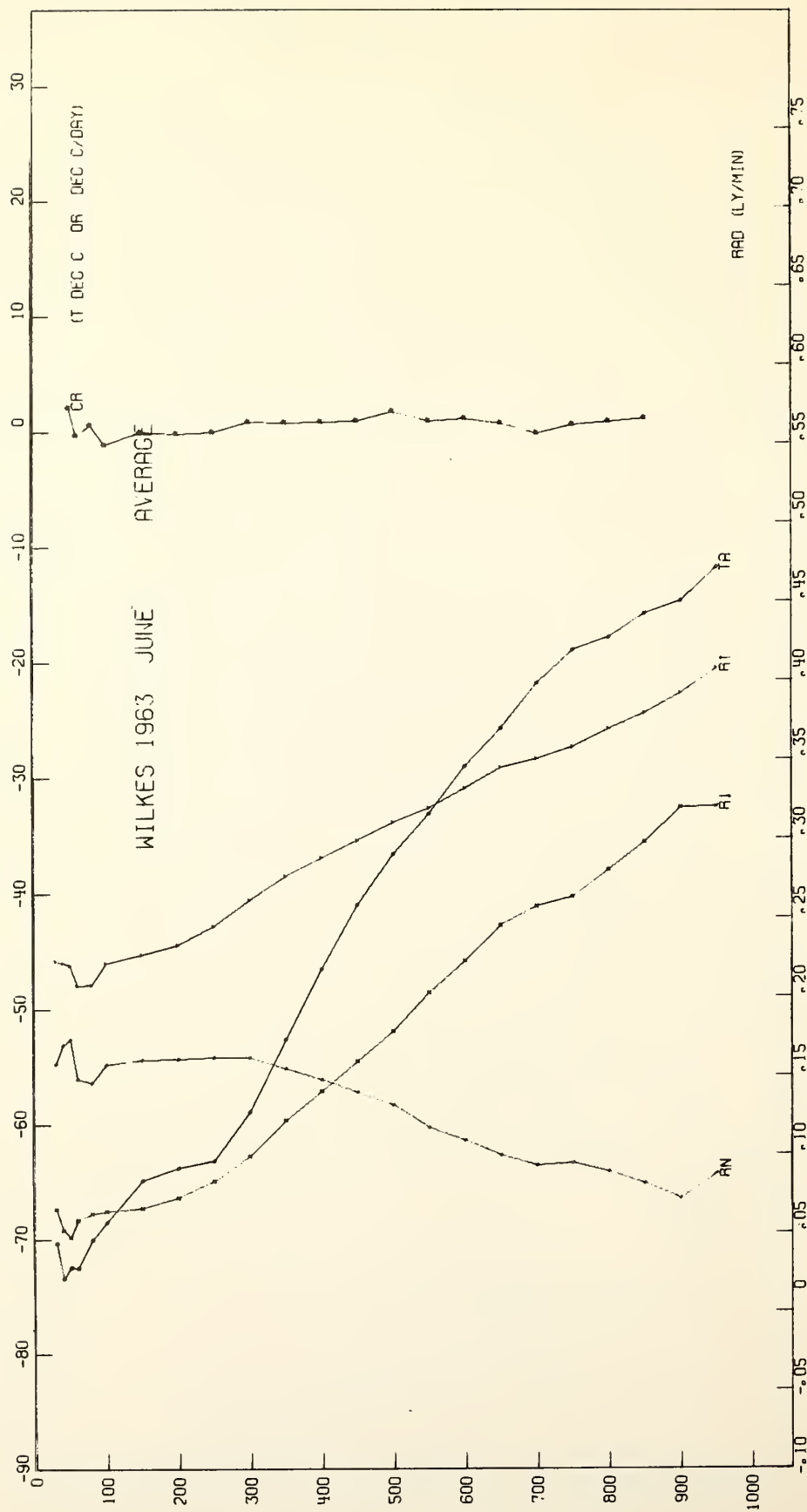


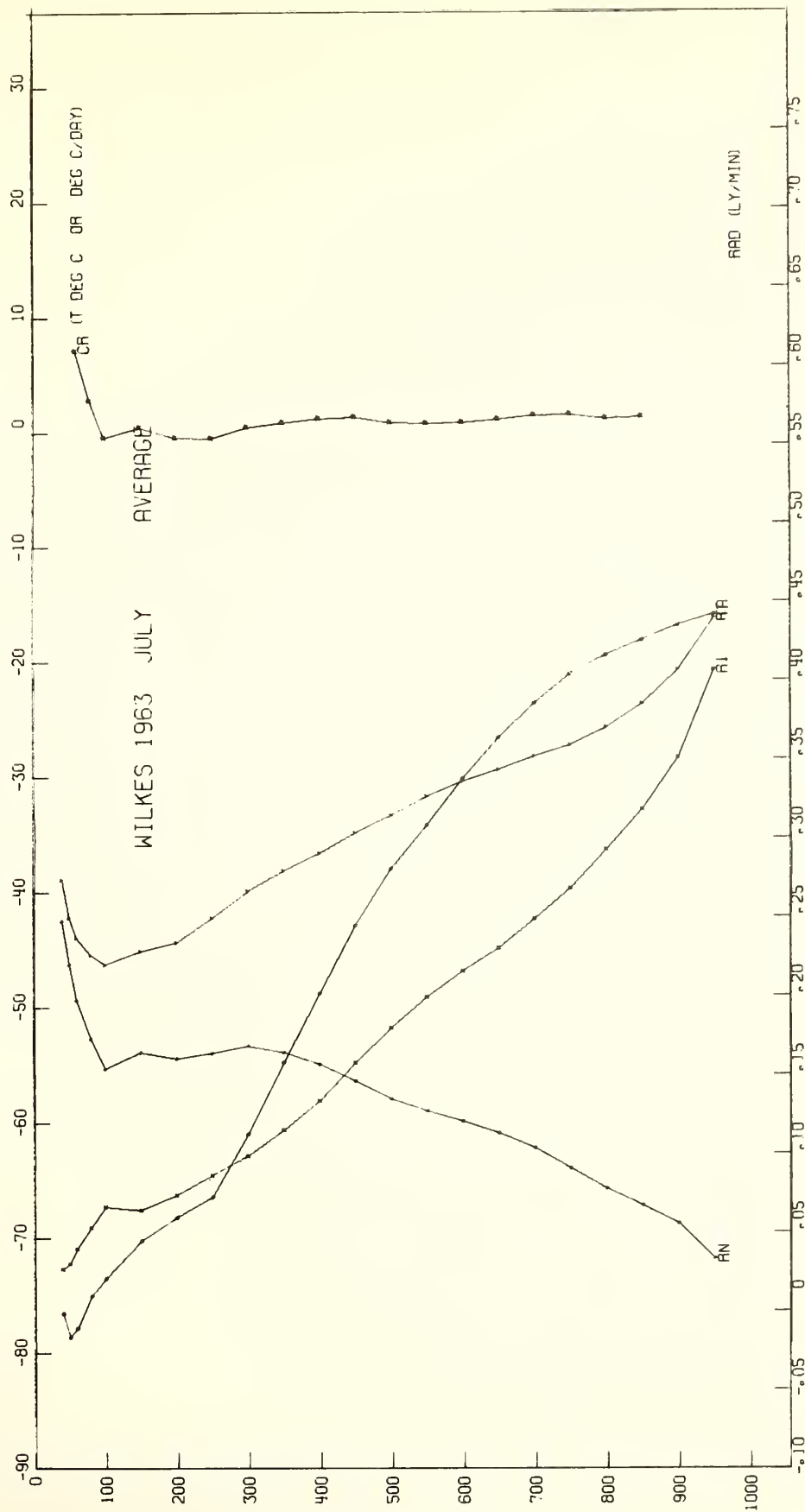


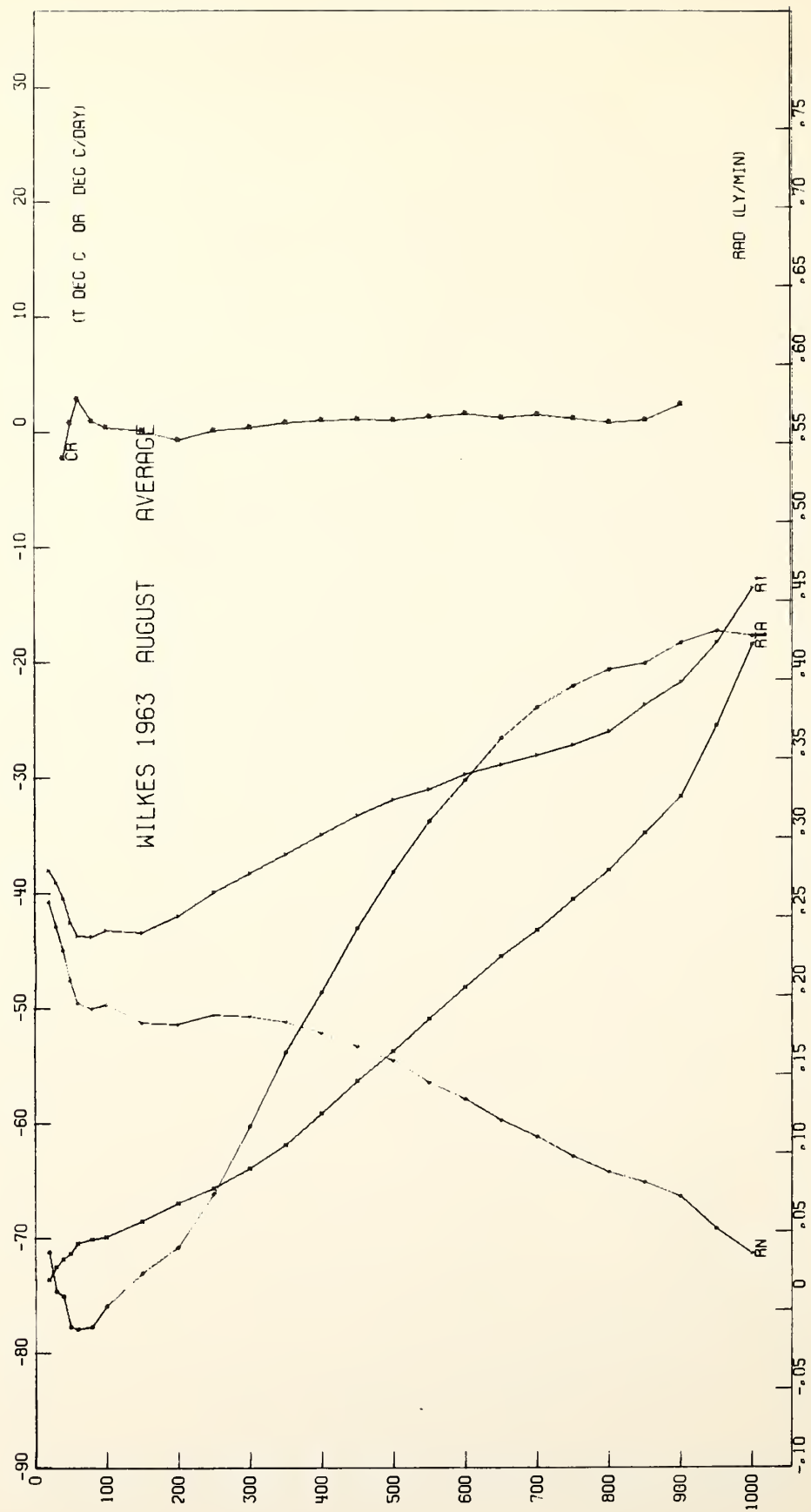






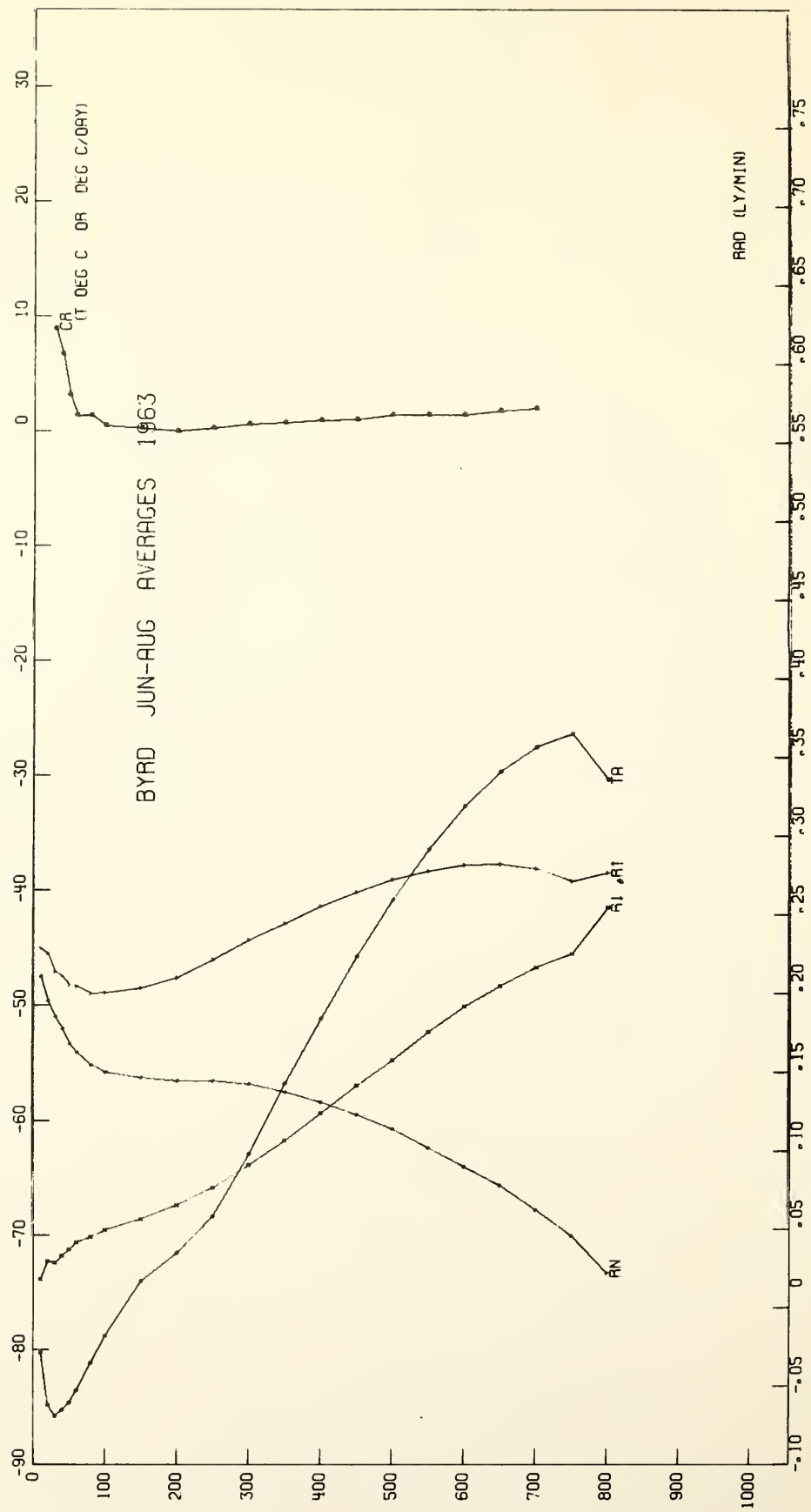


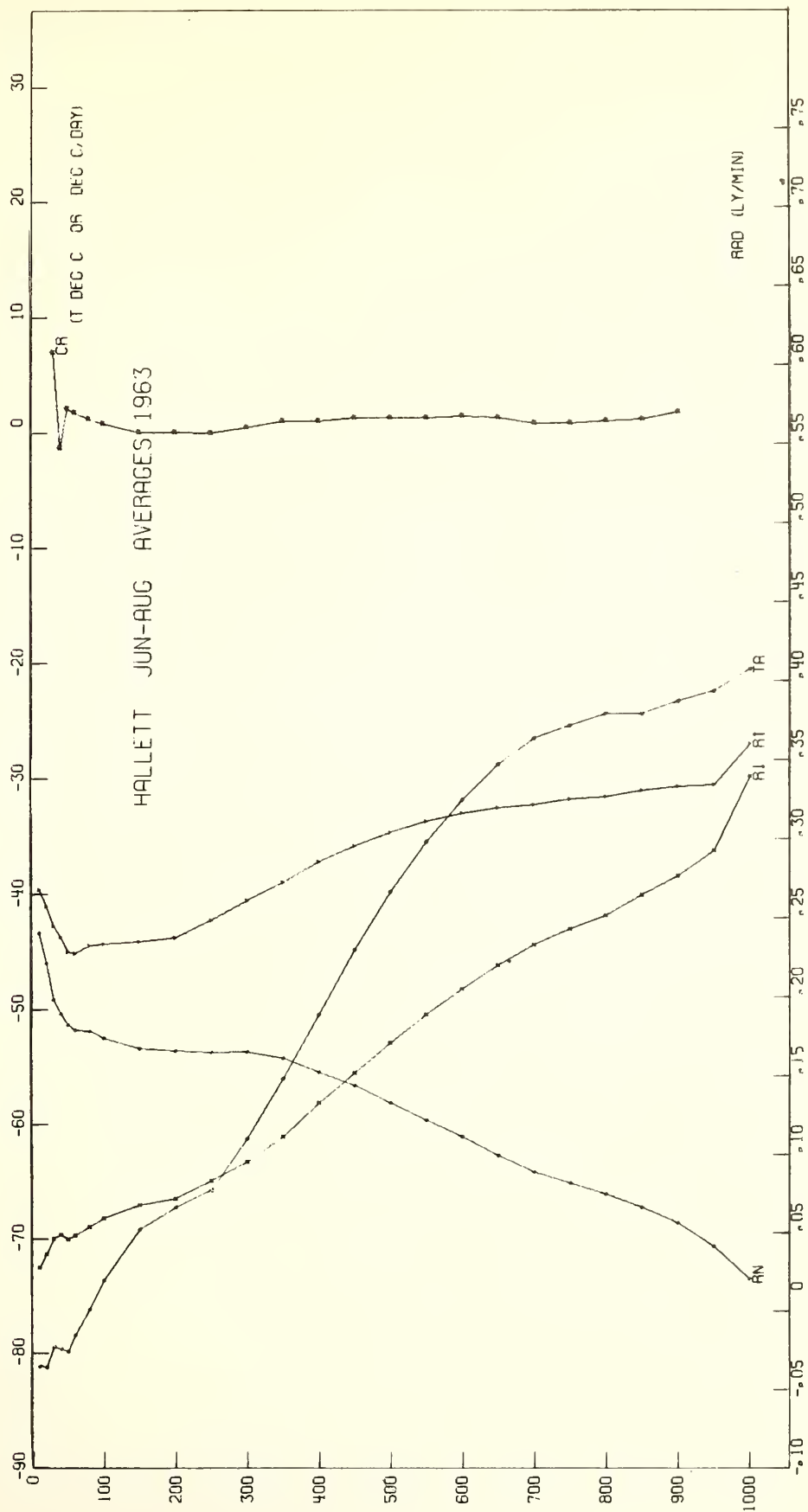


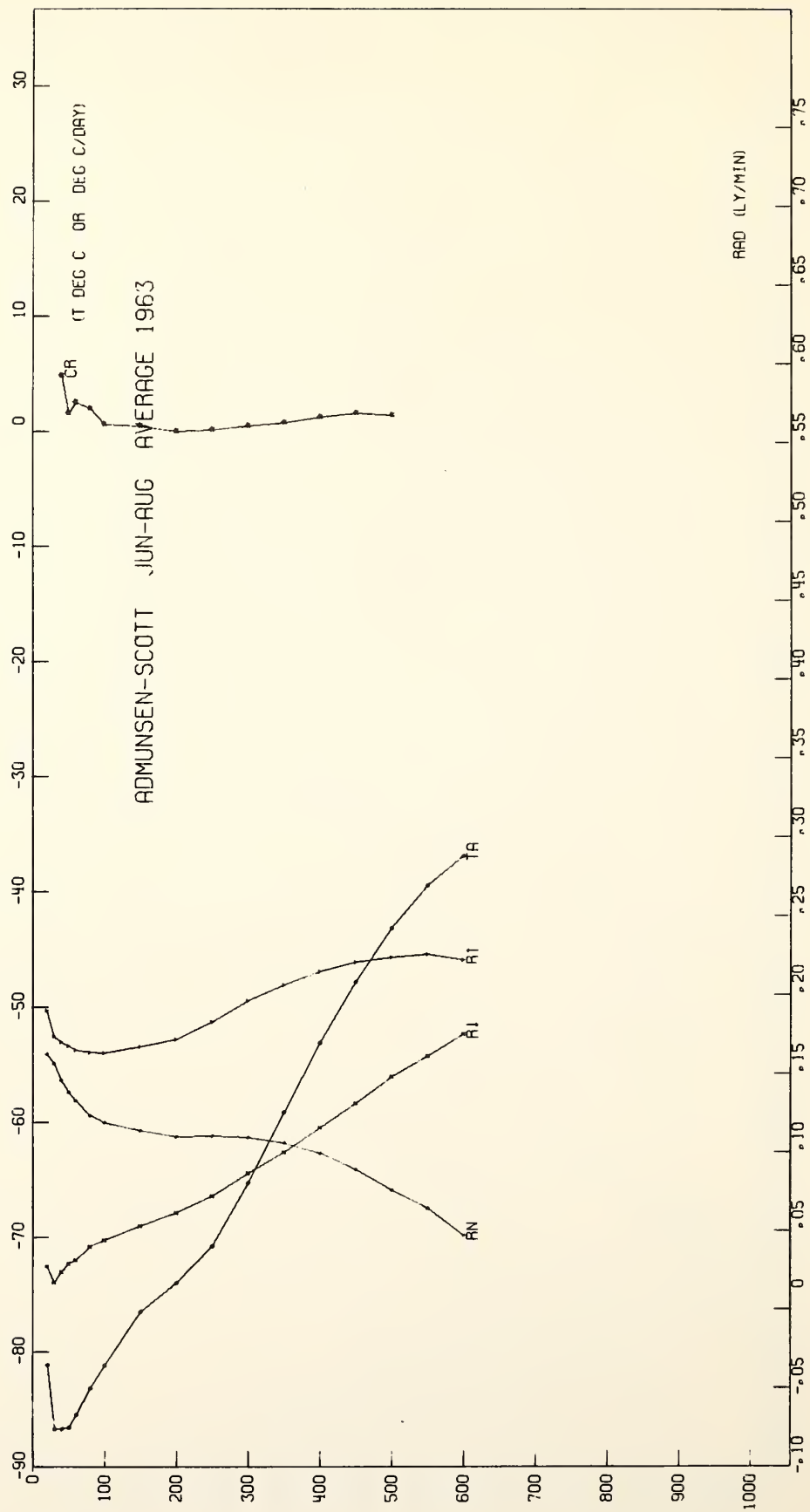


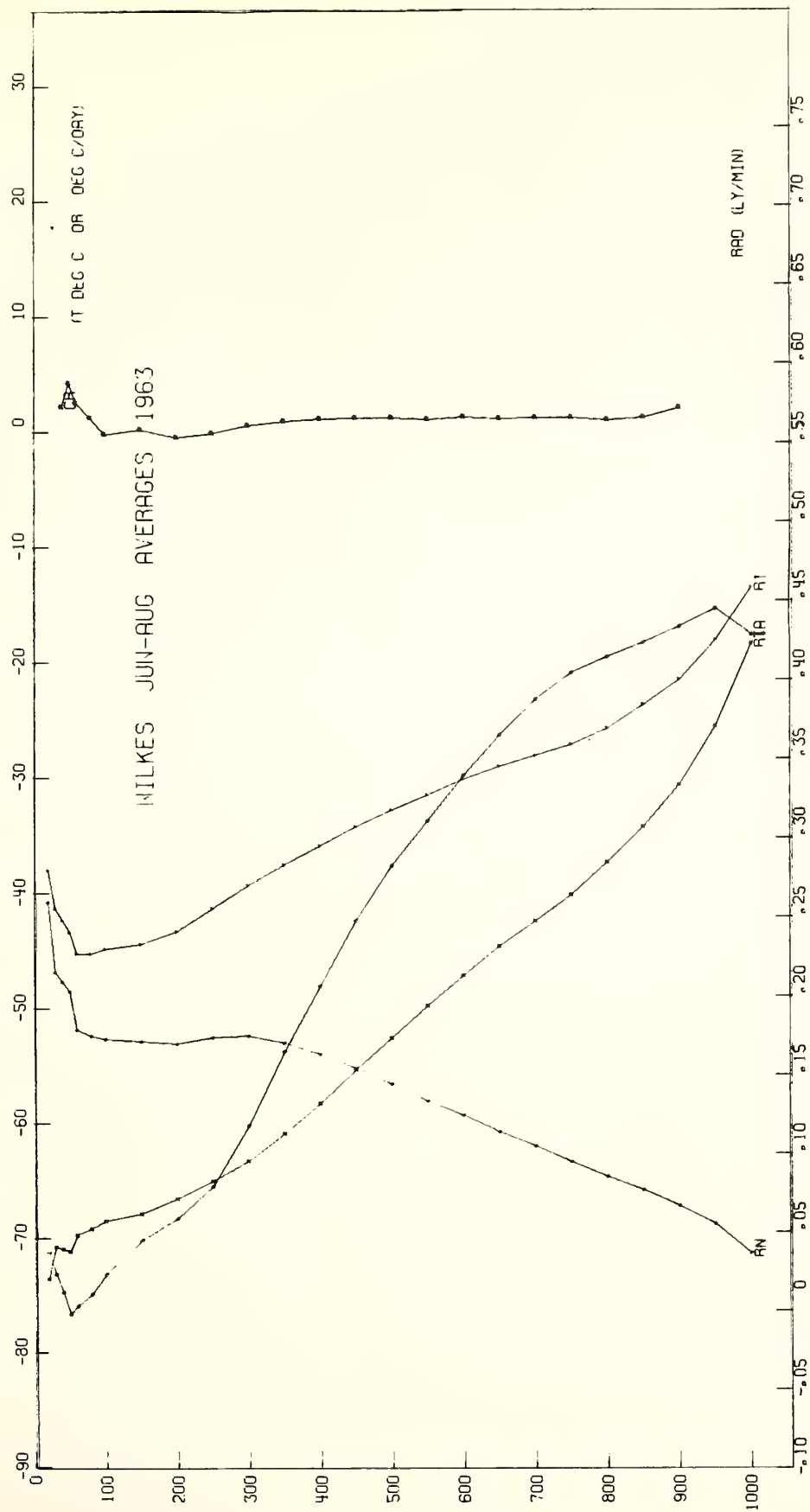
APPENDIX F

Computer Plots of June, July, August Radiometersonde
Data Averages by Stations









PENN STATE UNIVERSITY LIBRARIES



A000072858615